

DIE
SPEKTREN DER ELEMENTE
BEI NORMALEM DRUCK

VON

PROF. FRANZ EXNER UND DR. EDUARD HASCHEK

ZUGLEICH II. WESENTLICH VERMEHRTE AUFLAGE
DER WELLENLÄNGENTABELLEN FÜR SPEKTRAL-
ANALYTISCHE UNTERSUCHUNGEN

BAND II

LEIPZIG UND WIEN
FRANZ DEUTICKE
1911

Verlags-Nr. 1682.

BAND II.

DIE BOGENSPEKTREN DER ELEMENTE.

Wir geben in diesem Bande die ausführlichen Bogenspektren der Elemente; sie sind geordnet nach der alphabetischen Reihe der chemischen Symbole. Die Verunreinigungen sind, wenn sie sicher erkennbar waren, aus den Tabellen weggelassen. Nur in der Gruppe der seltenen Erden, soweit dieselben chemisch noch nicht genügend getrennt sind, haben wir die Gruppenverunreinigungen unter Beifügung der betreffenden chemischen Symbole in den Tabellen belassen.

Vor jedem Elemente findet sich die Literatur der Bogenspektren angegeben, soweit dieselbe gegenwärtig noch Interesse beansprucht, sowie das Material, das wir zu den Aufnahmen verwandten, dessen Verunreinigungen und endlich die Zahl der gemessenen Linien. Wo Banden zu beobachten waren, sind die Kanten derselben ohne Intensitätsangabe dem Linienspektrum des Elementes am Schlusse beigefügt. Es bedeutet dabei die Bezeichnung K. V. oder K. R. das die betreffende Kante nach Violett, resp. Rot abschattiert ist.

Die Intensitätsskala der Linienspektren schließt sich der Rowlandschen an; wir bezeichnen mit 1 die Linien geringster Intensität und mit 1000 die stärksten. Von den zur Charakterisierung der Linien verwendeten Zeichen ist zu bemerken:

- ± bedeutet unscharf,
- d " doppelt,
- u " umgekehrt,
- br " breit,
- r " verwaschen nach Rot,
- v " verwaschen nach Violett,
- () " , daß eine Linie des eingeklammerten Elements über die gemessene Linie fällt.

I. Ad. Aldebaranum.

Ältere Messungen: J. M. Eder und E. Valenta, Wiener Akad. 119 IIa. (1910) (Rot).

Material: Aldebaranumnitrat aus Oxid von C. Auer v. Welsbach.

Verunreinigungen: Cp, Tm.

Linienzahl: 905.

2320.95	1	2665.10	2	2759.63	1 +	2821.27	3
90.82	1	68.80	1	60.89	2	23.69	1
2464.61	2	72.04	2	61.48	2	24.33	1
2502.12	1	72.72	3	64.54	2	25.09	3
09.19	1	74.97	1 +	65.85	1 +	26.55	1 +
12.15	2	79.65	1	68.40	1 +	27.13	1
37.75	1	80.46	1	71.19	1	28.05	3
38.77	2	83.49	1	71.45	2	31.10	3
52.25	1	84.82	2	74.86	1	32.33	1
52.81	1	88.03	1	75.06	1	33.96	1 +
61.75	1	92.09	1	76.38	3	35.09	2
71.45	1 +	92.50	1 +	76.68	1	38.76	1 +
78.87	1 +	95.51	1	77.15	1	39.02	1
88.36	1	96.70	1	77.56	1 +	39.19	1 +
96.25	1	97.57	1	79.65	1	39.97	1 +
96.40	1	2700.86	1	80.95	1 +	41.46	1
2604.10	1	01.80	2	84.76	2	42.25	1
13.49	1	08.91	1	85.16	2	42.40	1
15.50	3 Cp	09.76	1	91.70	1	42.69	1
17.10	2	10.62	2	92.26	1	44.78	2 Tm.
19.15	1	10.72	1	93.38	1	47.30	4
19.33	1	11.86	1	94.51	1	47.60	3 Cp ?
24.41	1	12.72	2	94.69	2	48.56	3
34.37	1	15.50	1 +	95.18	1	49.00	1
39.51	1	16.00	1	96.71	2	49.45	1
40.83	1	18.43	2	97.38	2 d	51.28	4
41.97	2	21.25	2	97.90	1	53.51	1
42.61	1	22.26	2	98.10	1	53.79	1
44.39	2	29.14	1 +	98.33	2	54.26	2
46.53	1	32.80	2	99.48	2	54.60	1
47.54	1	33.18	1	2800.12	2	55.00	1 +
48.86	1	34.15	1	00.50	1	58.48	2
49.85	1	41.80	2	04.35	1	58.55	1 +
50.35	1	45.78	1	08.10	1	59.50	2
50.80	1	48.13	1	08.50	1	59.90	3
53.82	3	48.77	3	10.80	1	60.50	1
56.20	1	50.59	4	12.37	1 +	61.34	3
56.88	1 +	51.54	2	14.61	2	61.44	2
57.88	1	54.27	2	16.45	1	61.83	1
58.55	1 +	55.03	1	17.40	1 +	65.45	1
59.34	1	56.81	1	18.25	1	67.18	3
60.16	1	59.10	1	18.59	2	68.11	1

2869.33	3	2927.96	1	2983.26	1	3034.76	2
70.17	1	28.34	1	84.10	4	36.10	1
73.12	1	32.73	1 +	85.20	3	36.94	1
73.60	1	33.14	1 +	85.48	1	38.09	2
79.26	1	34.47	1	86.00	2	38.64	1
81.98	1	35.22	2	86.65	2	38.84	1
82.25	1	36.11	3	87.76	1	39.78	3
85.30	1 +	37.30	1	89.40	2 Cp?	42.48	3
86.12	2	38.30	1	90.50	1	42.76	3
86.35	2	39.44	1	90.66	3	44.10	2
88.14	3	39.66	2	91.99	2	44.94	1
88.62	1	40.64	2	93.00	1 +	46.15	1
89.77	1	42.16	2	93.37	2	46.59	2
91.10	2	42.95	1	94.04	2	46.93	2
91.52	10	43.48	1	94.91	4	47.15	2
93.78	2	46.02	3	95.99	2	48.91	2
94.43	1 +	46.41	2	98.50	1	50.83	2
94.99	3 Cp	46.90	1	3000.59	2	52.62	1 +
97.05	1	47.25	1 +	02.15	1	53.83	1
99.85	3	49.35	2	02.70	2	54.17	2
2900.46	3 Cp	50.47	1	05.90	5	55.30	1
02.56	1	51.15	1	06.24	1	56.20	2
03.06	1	51.40	2	06.45	1	56.84	3 Cp
03.18	1	51.81	2 Cp?	09.01	1	58.52	1 +
05.55	1	53.15	1	09.50	3	61.26	1
07.00	1	55.44	2	10.75	3	62.19	1
07.30	1 +	57.75	2	12.14	1	63.26	2
08.25	1	59.76	2	13.82	2	63.80	2
08.46	2	60.96	1	14.55	3	64.13	1
09.32	2	61.90	1	14.79	3	65.01	1
09.61	2	62.64	3	15.42	4	65.17	4
10.50	1	63.45	4 Cp	17.21	2	66.56	1 +
11.53	8(Cp)	64.54	1	17.68	3	68.26	1 +
13.01	1	64.89	3	18.72	1	71.70	1 +
14.10	1	66.00	2	19.94	1	73.20	3
14.34	3	67.85	1	20.66	3(Fe)	73.61	2
14.60	1 +	69.96	2 Cp	22.55	1	78.79	1
15.00	1 +	70.70	5	23.83	1	73.95	1
15.40	3	70.90	1	25.96	2	74.64	1
16.61	2	74.40	1	26.20	2	75.35	1
18.39	2	75.69	1	26.80	3	76.15	2
19.49	4	77.66	1	28.20	1	77.74	5 Cp
21.25	3	78.55	2	28.84	1	79.37	1
22.21	1 +	79.03	1	29.35	1 +	80.26	1
22.96	1	79.60	1	30.26	1	81.26	2
24.36	2	79.81	1	31.26	15	81.60	3 Cp
25.76	2	80.00	1	32.75	1 +	84.48	1
26.02	1	82.61	2	33.96	1	85.93	1
26.86	3	82.75	1	34.22	1	87.11	2

3088.46	1	3145.16	3	3206.27	1	3272.74	1
88.91	1	45.62	3	10.26	1	75.91	2
89.21	4	46.24	3	10.70	2	76.92	4
89.72	1+	47.99	1	14.75	1	79.09	3 Cp
93.21	1	49.09	1	15.59	1	81.88	4 Cp
93.54	1	50.16	1	16.23	1+	83.52	5
93.99	3	51.14	5	17.30	3	84.80	1
95.01	2	53.28	2	18.45	3	85.77	3
95.34	1	53.99	3	21.30	1+d	87.05	1
95.50	1	55.30	3	21.60	1+	89.50	200
97.05	2	55.90	1	25.99	4	91.15	4
98.10	1	56.65	1	26.87	2	94.43	1
98.70	3	57.49	5	29.04	1	97.98	1
99.70	1	58.40	2	29.95	1	99.24	1
3101.45	2	62.40	2	30.71	1	99.56	1
02.18	2	63.90	3	31.66	3	99.92	1+
02.97	2	65.00	1	32.14	3	3301.60	1
07.99	15	65.31	2	33.88	2	02.00	1+
09.86	1	68.30	2	35.60	4	02.60	5
11.10	1+	68.95	1	36.30	3	03.30	1
13.40	1	69.19	3	36.98	4	04.70	3
15.40	3	70.00	1	38.03	1+	04.90	3
16.15	2	71.30	2	39.34	2	05.40	3
16.42	1	71.50	2 Cp	39.73	2	05.87	4
16.53	1	72.94	10	40.38	4	06.15	2
16.79	2	73.70	2	41.70	3	06.99	3 d
17.39	1	73.90	1	43.16	1	08.12	2
17.90	4	75.86	2	44.30	1+	09.50	3
18.51	2 Cp	77.57	2	44.90	1	09.92	4
22.60	1	78.31	1	46.00	2	10.71	4
23.36	1	81.03	3	46.20	2	12.24	4 Cp
23.57	1	85.59	2	47.13	1	15.22	3
24.96	1	86.69	1	50.00	1	16.29	1
25.51	2	87.52	1	51.79	1	16.65	2
26.06	2	89.76	1	54.50	4 (Fe) Cp	17.00	3
27.25	1	90.94	1	54.90	1+	18.41	1
27.93	2	93.01	8	58.15	5	18.80	1
29.20	1	94.36	2	58.73	1	19.15	2
31.37	10	94.88	2	59.21	3	19.37	3
32.69	1	95.45	2	60.92	1	19.60	3
33.99	8	95.71	1	61.63	4	20.48	1
34.40	1	96.20	1	61.80	3	23.40	2
36.23	1+	96.46	1	64.21	3	24.34	2
36.85	3	96.66	1	64.90	1 Tm	24.64	1
38.50	1	98.24	3 Cp	66.75	4	25.29	1
41.01	4	98.79	3	67.52	3	25.98	1
41.85	3	3200.11	1	68.00	1	27.35	2
42.00	1	01.30	4	69.10	3	27.71	2
44.99	2	04.81	1	71.65	2	28.64	1+

3529·62	2 d	3390·38	2	3437·79	2	3487·20	2
31·40	1	90·53	2	38·84	3	87·53	2
33·21	3	91·21	3(Ni)	38·96	3	88·53	3
35·21	1 +	92·11	1 Tm	41·69	10	88·90	2
37·31	8	93·30	1	43·14	1	92·70	3
37·95	1	93·75	1	43·52	1 +	96·02	4 +
43·07	10	94·56	2	43·74	2	3500·04	1
46·64	3	95·29	1	44·80	1	06·23	1
47·69	3	96·49	1	45·83	1 +	07·51	5 d Cp
50·10	2	96·93	2 Cp	46·69	1	07·90	3 (Cy)
51·21	2	97·21	5 Cp	47·02	3	08·55	2 Cp
51·40	3	97·65	4 Tm	49·30	2 + br	13·16	1
52·25	1	98·16	3	49·90	2	15·98	3
52·61	3	98·80	2	50·78	1 +	18·25	3
53·40	1	3400·09	3	51·10	1	20·40	4
53·86	1	00·77	2	52·51	3	29·20	1
55·01	3	01·14	3	53·84	5 Tm	31·40	1
56·00	1	02·41	3	54·24	5	34·20	2
57·11	1	04·24	3	54·90	1	34·68	2
57·44	1	05·03	1 +	55·81	1 +	35·00	2
57·90	1 +	05·23	1 +	57·28	1	35·65	10
59·37	2	09·34	1	58·50	4	36·34	1 Tm
59·71	4 Cp	10·20	3	59·17	1	36·66	5
61·21	1	10·71	1	59·81	2	38·04	1 Tm
61·72	1	11·40	2	60·40	3	39·50	2
62·62	4	11·71	1	61·32	1	42·50	1 +
62·80	10	12·64	4	62·37	5 Tm	44·21	8
63·80	3	16·13	1	62·90	1.	45·05	4
65·21	2	16·73	3	64·47	20	45·91	3
66·14	2	17·04	2	67·20	2	48·62	3
67·12	1	17·17	2	67·65	2	49·05	3
68·49	2	18·57	4	69·23	1	49·94	3
68·79	1	19·75	2	69·39	1	52·45	2
69·75	2	20·50	2	70·05	1	54·59	5 Cp
74·64	4	21·80	1	70·85	1 +	57·94	2
75·62	5	21·91	1	71·20	1	59·15	2
76·69	5 Cp	23·86	1 +	72·60	5 Cp	60·49	10
77·65	1	25·27	10	74·26	1	60·85	10
78·05	1 +	25·77	5	74·66	1	64·06	3
78·65	2 + br	26·18	4	74·95	2	66·05	2
79·91	3	28·61	3	76·45	8	66·61	4
80·16	1	29·50	2	79·00	8	67·29	2
82·67	3	30·11	4	79·51	1	67·50	2
84·82	1	31·31	8	79·87	1	68·00	4 Cp
85·20	2	31·50	2	80·57	1	70·71	3
85·64	2 Cp	32·88	1	81·12	2	72·66	1 +
87·25	1	35·02	1	81·67	1	74·20	1 + Tm
87·62	4	35·51	2	81·89	2	77·17	2
89·10	1	36·59	3	85·90	3	85·61	8

3600·90	1 +	3770·24	8	4077·45	3	4376·65	1
04·00	1 +	73·60	1 +	86·86	1 +	86·61	4
06·63	4	74·49	1 Y?	89·83	4	92·50	1
08·93	5 Tm	82·71	2	91·67	1	93·90	3
09·66	1	83·70	1 + Tm	94·35	5 Tm	4402·46	1
10·37	1	87·30	1 +	98·06	1	09·50	2
11·46	2	91·90	3	4106·00	5 Tm	27·57	2 +
19·98	5	95·91	10 Tm	13·23	1	30·36	2
30·00	1 +	3807·72	2	19·65	2 +	39·36	10
34·70	2	10·90	2 Tm	21·88	2 +	81·48	5 Tm
37·91	4	16·39	2	23·02	1 +	82·60	3 +
38·54	1	17·57	2 Tm	24·90	1 Cp	87·39	1 +
43·80	2 Tm	36·65	2	35·29	5	94·18	1
47·95	2 (Fe)	38·32	4 Tm	38·45	1 Tm	4515·32	4
48·25	1	40·01	3	49·24	5	18·71	4 Cp
51·00	1+(Cu)	43·10	1 +	70·30	3	22·72	4
53·77	2	48·15	15 Tm	74·75	2	53·75	2
65·95	1 Tm	72·97	3	81·00	10	64·17	3
68·22	3 Tm	83·24	5 Tm	84·43	3 Cp	76·40	10
69·85	4	87·48	4 Tm	87·79	5 Tm	82·53	5
70·83	2	90·65	1 Tm	90·49	3	89·38	2
75·22	4	96·75	1 Tm	4200·09	2 Tm	91·00	3
78·12	2	3900·97	4	03·90	4 Tm	98·50	2
79·03	2 Tm	04·93	3	06·20	1 +	4616·10	3 Tm
83·24	1 +	05·97	1	10·43	1 +	26·70	1 Tm
90·71	3	11·39	2	18·75	3	34·40	1 Tm
91·62	1	13·50	1	22·85	1 + Tm	44·70	2
94·35	100	16·59	3 Tm	28·15	1	50·21	2
98·76	2	29·70	2 Tm	32·19	1	57·21	1
99·67	1 +	34·40	1	34·72	1	58·19	1 Cp
3700·00	1 +	38·36	2	37·10	1	64·40	1 +
00·40	8 Tm	38·64	2	42·31	5 Tm	70·75	1
01·52	8 Tm	47·09	2	52·70	2	82·12	1 +
04·99	2 Tm	49·41	2 Tm	55·98	1	84·00	2
08·85	1 +	58·24	4 Tm	57·83	1	84·45	2
10·49	2 Y?	68·21	1	77·90	3	4718·80	2 +
18·04	10 Tm	80·10	1 +	4301·19	2	24·45	1 +
22·41	2	88·16	100	06·12	4	26·24	8
24·36	3	91·04	5	09·99	2	33·51	2 Tm
25·20	4 Tm	95·73	2 Tm	17·13	3	51·98	1 +
30·50	1 +	96·66	3 Tm	22·40	1	53·09	1 +
34·27	3 Tm	4000·98	1 +	26·60	1	82·07	8
34·81	2 +	07·50	1 +	36·7	1 + br	86·79	10
44·20	8 Tm	40·24	2	51·30	1 +	4816·60	2
49·82	2 +	43·20	1	53·10	2 +	18·52	1
51·95	5	44·66	1	60·09	5	20·41	3
57·00	2 Tm	47·55	1	63·86	1	31·39	1
61·49	10 Tm	52·43	2 +	68·10	1	37·11	2
62·08	8 Tm	56·35	2	70·97	1	37·64	1

4848.63	1 +	5147.23	1 +	5363.87	1 +	5771.90	1 +
51.31	2	96.29	1 +	78.00	1 +	5837.36	1
94.78	2	5211.75	1 +	90.09	1	5991.8	1 + br
95.15	1 +	40.69	1	5449.50	1	6052.88	1 +
4912.50	1 +	44.27	1	76.90	5 Cp	6222.10	2 Cp
35.69	10	57.64	1	82.15	1	47.20	1
37.38	1	65.72	1 +	5501.85	1 +	75.01	2
44.23	1	77.23	3	05.73	1	6332.50	1 +
67.06	3	79.69	2	39.23	2	46.20	1
94.35	1 + Cp	5301.13	1	56.67	20	96.60	1
5000.25	1 + br	07.29	3	88.69	1	6403.35	1
09.69	2	35.32	5	98.66	1	63.27	2 + (Cp)
34.40	1	45.87	1 +	5631.60	1	89.32	5
74.50	3	47.39	2	52.19	2	6668.10	1
76.92	1 +	53.11	5	76.06	1	6799.91	1
5135.30	1 + Cp	58.82	1	5720.25	3		

II. Ag. Silber.

Ältere Messungen: H. Kayser und C. Runge, Wied. Ann. 46 (1892.)

Material: Feinsilber aus der Kaiserl. Münze.

Verunreinigungen: Cu, Ni.

Linienzahl: 27.

2309.61	3	3130.1	1 + br	3766.50	1 +	4476.23	5
73.20	1 +	3280.84	500 u	3810.85	2 + br	4668.68	8
74.75	2 + br	3383.02	300 u	3981.78	1	4874.32	1 +
2437.83	1 +	3469.30	1 +	4055.42	50 u ¹⁾	5209.21	30
2721.85	2	3502.08	1 +	4212.15	10 + u ¹⁾	5465.68	50 +
2824.5	2 + br	3624.4	1 + br	4311.21	1	71.73	10
3099.21	1	82.45	2 + br	79.40	1		

III. Al. Aluminium.

Ältere Messungen: H. Kayser und C. Runge, Wied. Ann. 48 (1893)

J. M. Eder und E. Valenta, Wiener Akad. 119 IIa (1910) (Rot.)

Material: Metall von E. Merck.

Verunreinigungen: Ga, Mg, Mn, Pb, Sn, Ti.

Linienzahl: 28.

2263.57	3	2370.30	1	2568.08	20 u	3050.20	3
69.25	3 u	72.20	2 +	75.20	20 u	54.81	3
2321.65	1 +	73.23	5 u	75.56	5 +	57.27	4
67.13	5 u	73.60	1 +	2652.56	15 u	60.04	1
69.37	1	78.53	3 +	60.50	20 u	64.43	3

¹⁾ Rote Komponente stärker.

3066.28	3	3228.27	2	3944.20	800 u	6170.6	1 + br
82.30	500 u	36.94	1	61.71	1000 u	77.8	1 + br
92.89	800 u ¹⁾	42.85	1	6151.9	1 + br	93.5	1 + br

Kanten.

4470.73	K. R.	4648.42	K. R.	4866.55	K. R.	5377.6	K. R.
94.26	K. R.	72.21	K. R.	5079.53	K. R.	94.6	K. R.
4516.60	K. R.	94.80	K. R.	5102.37	K. R.	5410.0	K. R.
37.80	K. R.	4716.70	K. R.	23.60	K. R.		
57.80	K. R.	36.10	K. R.	43.15	K. R.		
76.60	K. R.	4842.40	K. R.	5357.9	K. R.		

IV. As. Arsen.

Ältere Messungen: H. Kayser und C. Runge, Wied. Ann. 52 (1894).

Material: Metall von E. Merck, mit Nickel legiert (40% As).

Verunreinigungen: Keine.

Linienzahl: 18.

2271.46	1 +	2370.85	2	2745.12	5	3032.95	4
88.18	4 u	81.26	2	80.37	10	75.46	2
2349.88	4 u	2437.30	1	2860.60	10	3119.70	3
63.13	1	56.60	3	98.86	5		
69.71	2	93.02	2	2991.10	3		

V. Au. Gold.

Ältere Messungen: H. Kayser und C. Runge, Wied. Ann. 46 (1892).

Material: Im Ultraviolet: Metall von C. Schuchardt, im Sichtbaren: Goldchlorid auf Gaskohle.

Verunreinigungen: Ag, Cd, Cu, Zn.

Linienzahl: 35.

2352.68	1	2883.56	1	4065.24	3	5064.79	2
87.80	1	2906.00	1	4242.00	1	5230.44	2
2428.00	5 u ²⁾	32.30	1	4315.32	2	5655.95	1 +
2590.15	1	3029.29	8	4437.46	1	5837.62	3
2641.60	2	3122.92	10	88.41	2	63.20	1 + br
76.02	15	3308.44	1 +	4606.68	1	5957.25	1 +
88.78	1	20.3	1 +	64.33	1 +	6278.40	4
2700.96	2	3909.49	1	4792.82	10	6332.48	1 + -
48.36	4	4041.10	1	4811.81	3		

1) Als Verunreinigung als doppelte Linie gemessen auf 3092.88 i = 2, 3092.99 i = 1.

2) Rote Komponente stärker.

VI. Ba. Baryum.

Ältere Messungen: H. Kayser und C. Runge, Berl. Akad. (1892).
 H. Lehmann, Ann. d. Phys. 8 (1902) (Ultrarot), V. Höller, Ztsch. für
 wiss. Phot. 6 (1908), J. M. Eder und E. Valenta. Wiener Akad. 119 II a.
 (1910) (Rot).

Material: Baryumbromid auf Gaskohle.

Verunreinigungen: Ca, Sr.

Linienzahl: 207.

2304·36	3 u	3586·69	2	4130·83	100	4673·75	3 +
35·38	3 u	88·32	3	32·58	5	91·85	8
47·65	1	90·15	1	66·17	10 r	4700·67	3 +
2596·87	1	93·50	1	79·58	1 +	24·96	1
2634·90	1	93·7	1 + br	4224·20	5 +	26·68	10
41·55	1	99·62	3	39·85	2 +	32·0	1 + br
47·42	2	3611·20	3 + r	42·80	4	39·5	1 + br
2702·70	2	30·85	10 + Ca?	64·45	2 +	4807·8	1 + br
39·38	2	37·2	2 + br	83·31	20 +	77·8	2 + br
71·46	1	40·56	3	91·33	5	4900·11	10
85·36	2	62·71	3	4323·05	3 + v	03·05	2
3071·72	20	64·82	1	25·34	3	34·26	100 u
3108·3	1 + br	75·45	1	32·97	3 +	47·50	2
84·5	1 + br	88·8	2 + br, r	50·60	15 +	95·90	1
3204·5	1 + br, r	3701·90	1	59·76	2	5055·14	2
23·0	2 + br, r	94·88	2 +	4402·80	20 +	94·1	1 +
53·2	1 +	3862·07	3 +	07·07	5 +	5160·10	5 +
63·0	2 + br, r	89·43	8	13·89	2 +	75·72	2 +
70·30	1 +	91·90	50	32·10	10	77·52	1 +
82·1	2 + br, r	92·90	10 r	67·50	3 +	5254·00	1 +
98·3	1 + br, r	3900·56	1 +	89·10	8 + br, v	65·80	1 Ca?
3315·92	1 +	06·15	1 +	93·79	6 + br, v	67·18	4 +
23·3	2 + br, r	10·03	50 r	4506·13	10	77·75	1 +
57·15	4 + r	17·38	2	23·48	10	79·6	1 + br
77·33	5 + br, r	35·91	50	25·19	10	91·05	1 +
3420·70	8 + br, r	38·03	8	54·21	1000 u	94·30	1 +
64·7	1 + br	45·3	1 + br	74·02	10	5303·00	2 +
3501·31	50	47·5	1 + br	79·82	15 +	05·92	1 +
25·30	20 r	75·6	1 + br	89·83	2 +	09·10	1 +
29·64	3	83·06	1	91·92	2 +	65·2	1 + br
31·8	2 + br	93·55	100	99·97	8 +	79·2	1 + br
45·00	20 + r	95·85	5	4605·10	1 +	81·2	1 + br
47·99	3 +	98·05	1 +	20·19	3	89·8	1 + br
62·19	2	4026·55	1 + r	28·45	3 +	5405·20	2 + br
66·83	2	81·1	1 + br	36·7	1 + br	24·85	50 r
76·24	2	85·0	1 + br	42·5	1 + br	37·56	2
77·81	3	87·6	1 + br	52·0	1 + br	73·90	2
79·91	20 r	4110·35	1	63·0	1 + br	5519·28	50

5535.70	100 u	5800.60	100	5985.4	1 + br	6483.21	50 u
46.3	2 + br	05.92	10	97.39	50	97.21	200 u
93.50	2 +	18.47	1 +	6019.70	50	99.10	100 u
5618.9	1 + br	19.19	3	63.44	50 u	6527.60	50 u
19.25	1 + br	26.56	100	83.67	5	81.00	1 +
20.2	1 + br	49.50	1 +	86.6	1 + br	95.65	20 u
20.6	1 + br	53.91	200 u	6111.10	100 u	6654.27	1 +
41.3	1 + br	59.51	1 +	29.50	2	75.50	10
80.45	5	5907.81	10	41.95	1000 u	94.08	10
5709.89	1 +	27.9	1 + br	6235.5	2 + br	6865.92	3
13.80	2 +	62.7	2 + br	6323.6	1 +	68.15	1 +
21.0	1 +	65.00	3 +	41.93	50	7060.19	3 u
78.00	500	72.00	50	6411.95	1 +	7120.58	1 +
84.29	3	78.69	2	51.11	30		

VII. Be. Beryllium.

Ältere Messungen: H. A. Rowland und R. R. Tatnall, Astroph. J. I (1895). J. M. Eder und E. Valenta Wiener Akad. 119 II a (1910) (Rot).

Material: Berylliumnitrat aus Oxid von L. F. Nilson, auf Gaskohle.

Verunreinigungen: Keine.

Linienzahl: 9.

2348.64	3 u	2650.71	10	3131.17	20	3321.50	20
50.90	1 +	3130.53	20	3321.23	20	4572.88	8
2494.76	8 u						

Kanten.

4708.89	K. R.
32.85	K. R.

VIII. Bi. Wismuth.

Ältere Messungen: H. Kayser und C. Runge, Berl. Akad. (1893). W. Schwetz, Ztsch. für wiss. Phot. 8 (1910). J. M. Eder und E. Valenta, Wiener Akad. 119 II a (1910) (Rot).

Material: Metall von C. Schuchardt.

Verunreinigungen: Pb, Sn, Tl.

Linienzahl: 48.

Bi, Bo, Br, C**Bogen**

55	1+(Cu)	2809.78	20+	3405.47	3	4493.19	2
98	8	63.90	3 u	3510.97	30	4615.29	1
18	1+	98.12	50 u	96.34	50	15.70	1
72	2	2938.43	50 r, u	3888.07	3	4692.50	1+
60	4	89.12	30	88.34	3	4722.61	20
00	10	93.41	30	4121.86	20+	22.83	2
76	4	3024.76	30	22.10	20+	34.0	2+br
91	4	35.02	10+	4220.65	1+	5209.5	1+br
55	3	67.84	500 u	54.46	2	97.8	1+br
69	3	76.79	10	4308.40	3	5552.52	4+r
35	20 r	3397.43	30 u	08.75	5	5742.75	1+br
30	2+	3405.32	3	4492.80	2	6135.2	1+br

IX. Bo. Bor.

e Messungen: H. Kayser und C. Runge, Berl. Akad. (1892).

A. Rowland und R. R. Tatnall, Astroph. J. 1 (1895).

ial: Borsäure von E. Merck, auf Gaskohle.

reinigungen: Keine.

nzahl: 2.

2496.84	20 u
97.80	20 u

Kanten.

2265—2300 Bande nach Rot, ohne angebbare Kanten.

·45	K. R.	2437.20	K. R.	2551.50	K. R.	2675.37	K. R.
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X. Br. Brom.

e Messungen: Fehlen.

ial: Bromkalium auf Gaskohle.

nzahl: 0.

XI. C. Kohlenstoff.

e Messungen: J. M. Eder und E. Valenta, Wiener Akad. 119. IIa (1910) (Rot).

ial: Gaskohle.

reinigungen: Al, Ba, Bo, Ca, Cu, Fe, Mg, Mn, Si, Ti, Va.

nzahl: 1.

2478.66	3
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Kanten.

3584.03	K. V.	4158.18	K. V.	4519.05	K. V.	4697.59	K. V.
85.97	K. V.	67.79	K. V.	32.03	K. V.	4715.20	K. V.
90.49	K. V.	81.00	K. V.	53.30	K. V.	37.02	K. V.
3861.70	K. V.	97.23	K. V.	78.16	K. V.	5129.30	K.?
61.86	K. V.	4216.13	K. V.	4606.28	K. V.	65.30	K. V.
71.51	K. V.	4502.28	K.?	85.00	K.?	5635.4	K. V.
83.50	K. V.						

XII. Ca. Calcium.

Ältere Messungen: H. Kayser und C. Runge, Berl. Akad. (1891).

H. Lehmann, Ann. d. Phys. 8 (1902) (Ultrarot). C. F. Meisenbach, Ztsch. f. wiss. Phot. 6 (1908). F. L. Cooper, Astroph. J. 29 (1909).

J. M. Eder und E. Valenta, Wiener Akad. 119 II a (1910) (Rot).

Material: Im Ultraviolett: Calciumnitrat auf Gaskohle, im Sichtbaren: Calciumchlorid auf Gaskohle.

Verunreinigungen: Ba, Na, Sr.

Linienzahl: 114.

2398.66	1 u	3706.18	10	4496.3	1 + br	5270.44	30
2995.06	3	37.06	20	4509.8	1 + br	5349.69	20
97.41	3	3933.81	500 u	12.7	1 + br	5513.16	8 +
99.74	2	49.10	8	27.35	20 + r	82.20	10
3000.96	2	57.22	10	78.88	20	88.94	20
06.97	4	68.63	300 u	81.77	30	90.30	8
09.30	3	73.91	10	86.22	30	94.70	20
3159.01	10	4093.00	4 +	4624.63	1 +	98.69	20
79.50	15	95.30	6 + d	85.35	5 +	5601.50	10
81.43	3	98.9	6 +	4722.48	1	03.09	10
3215.0	1 + br	99.2	2 +	37.00	1 +	5718.56	1 +
25.6	1 + br	4226.90	1000 u	42.10	1	43.55	1 +
69.37	1 +	40.61	3 +	84.50	1	5857.69	10
74.95	1 +	83.20	50	4807.8	1 + br	67.89	1
86.35	1 +	89.50	50	23.2	1 + br	6006.31	1
3344.52	2 +	99.18	30	34.1	1 + br	6102.92	10
50.25	5 +	4302.70	100	47.38	2 + br	22.49	15
61.95	10 +	07.90	30	78.38	20	61.57	3
3468.70	1 +	18.80	50	4981.94	1	62.41	10
75.01	2 +	55.50	3 + r	5041.83	20	64.05	2
87.82	4 +	4425.60	100	5189.00	100	66.70	3
3624.19	10 +	35.17	100 u	5260.58	5	69.30	3
30.87	20 +	35.88	50	61.87	10	69.82	4
31.07	8 +	55.00	200 u	62.40	10	6406.0	1 +
44.53	20 +	56.10	20	64.41	15	17.90	1 +
44.90	8 +	56.84	8	65.73	20	39.35	50

6449·3	1 + br	6462·80	30	6494·02	20	6573·00	2
50·01	15	64·95	1	99·84	8	6717·90	4
55·83	4	71·90	10				

Kanten.

5934·2	K. V.	5949·4	K. V.	6181·5	K. V.	6206·5	K. V.
35·6	K. V.	51·6	K. V.	82·2	K. V.	06·9	K. V.
36·8	K. V.	54·0	K. V.	83·0	K. V.	07·5	K. V.
38·3	K. V.	56·5	K. V.	83·9	K. V.	08·1	K. V.
39·8	K. V.	59·3	K. V.	84·9	K. V.	08·9	K. V.
41·5	K. V.	62·1	K. V.	91·8	K. V.	09·7	K. V.
43·3	K. V.	83·3	K. R.	92·7	K. V.	10·6	K. V.
45·2	K. V.	6181·0	K. V.	93·5	K. V.	11·7	K. V.
47·2	K. V.						

XIII. Cd. Cadmium.

Ältere Messungen: H. Kayser und C. Runge, Berl. Akad. (1891).

Material: Metall von E. Merck.

Verunreinigungen: Pb, Tl.

Linienzahl: 38.

2240·0	1 +	2764·2	3 + br, r	3252·86	20 r	4307·2	2 + r
65·10	2 + u	75·20	2 + br, r	61·23	20 u	4413·21	3
67·55	2 +	2837·05	10 +	3403·86	100 u	15·86	1
2306·71	2 +	68·40	2 + r	66·37	100 u	4662·8	5 + r
13·1	1 +	80·89	10 + r	67·81	50 u	78·38	50 +
29·36	3 +	81·35	8 + r	3500·20	2	4800·14	100 u
2573·2	1 +	2961·4	1 + br	3610·72	500 u	5086·10	100 u
2639·6	1 + br	80·80	30 + br	13·11	50 u	5155·0	1 + br
77·8	2 + br	3081·11	10 r	14·62	10	6438·70	200
2748·75	1 +	3133·47	20 r				

XIV. Ce. Cer.

Ältere Messungen: A. Bakowski, Ztsch. für wiss. Phot. 6 (1908).

F. L. Cooper, Astroph. J. 29 (1909). J. M. Eder und E. Valenta, Wiener Akad. 119 IIa (1910) (Rot).

Material: Ceronitrat von L. Haitinger, auf Gaskohle.

Verunreinigungen: Pr (Spuren).

Linienzahl: 2894.

2651·13	1	3130·99	2	3221·33	3	3286·50	1
52·57	1	32·73	1	22·55	1	87·54	1
60·47	1	33·46	1	23·53	1	88·29	1
2831·05	1	36·84	1	24·06	1	88·89	1
54·76	1	37·73	1	25·83	1	90·50	1
54·99	1	42·40	1	26·17	1	90·73	1
74·26	1	44·71	1	27·25	3	93·75	1
2908·55	1	45·39	2	29·25	1	95·09	1
56·06	1	46·52	2	29·49	2	95·45	2
64·93	1	48·59	1	31·39	2	96·34	1
72·82	1	49·52	1	32·43	1	97·04	1
74·70	1 +	51·27	1	33·56	1	98·48	1
77·03	1	54·62	1	34·31	3	3300·15	1
77·57	1 +	55·89	2	35·04	2 r	00·30	1
91·01	1	64·30	2	35·80	1	03·37	1
95·77	1	66·40	1	36·87	3	04·98	2
3002·25	1	66·74	1	42·28	1	06·77	1
02·87	1	67·41	1	43·50	3	07·36	1
03·66	1	69·32	2	45·31	1	08·16	2
08·89	2	71·76	2	45·68	1	09·40	1
17·29	1	72·46	1	46·82	2	11·03	1
17·67	2(Cr)	76·93	1	49·30	1	11·63	1
21·68	2 Cr?	77·26	1	49·56	1	12·35	1
37·85	1	78·89	1	52·65	2	13·44	1
52·08	1	81·00	1	54·18	2	14·17	1
55·35	2	83·65	2	56·81	1	14·86	2
56·87	2	84·35	1	59·02	1	15·24	1
63·12	3	86·24	2	59·97	1	17·94	1
68·78	1 +	87·79	1	61·12	1	19·10	1
69·78	1	88·92	2	63·55	1	20·60	1
71·25	1	89·75	1	64·04	1	21·09	1
71·74	1	90·50	2	65·60	1	23·46	1
73·03	1	94·95	3	70·28	1	25·50	1
77·47	1 +	96·06	1	71·29	1	26·23	1
79·75	1	99·41	1	71·67	1	27·40	1
80·05	1	3201·25	1	72·13	1	27·81	1
83·79	1	01·85	3	72·39	3	28·07	1 d
84·57	1	03·05	1	72·85	1	29·15	1
90·51	1	06·07	1	75·00	2	30·64	1
91·44	1	06·60	1	76·36	1	31·39	1
96·64	1	07·03	1	79·14	1	31·95	1
97·05	1	07·74	1	79·99	2	32·37	1
3103·50	2	11·08	1	80·65	1	32·63	1
07·58	1	12·63	1	81·23	1	33·20	1
09·07	1	12·71	1	83·50	1	33·82	1
10·40	1	16·81	1	83·84	1	34·05	1
11·32	1	18·50	2	84·36	1	34·43	1
27·62	1	19·06	3	85·35	2	34·60	2
30·45	1	21·04	1	86·16	1	36·50	1

3336.68	1	3387.93	1	3542.52	2	3488.67	1
39.66	1	89.80	1	43.09	1	90.29	1
39.95	1	90.67	1	43.65	1	91.81	1
41.05	1	91.76	1	46.35	1	92.65	1
42.04	2	93.75	1	46.85	1	93.25	1
44.00	2	94.08	1	48.41	1	93.86	1
44.91	3	94.29	1	51.76	1	94.80	1
45.56	1	95.20	1	53.39	1+	95.16	1
46.65	1	95.57	1	54.60	1	95.62	1
48.30	1	96.89	1	54.96	1	96.08	1
50.11	1	98.86	1	56.84	1	96.48	1
50.86	1	99.12	1	56.92	1	97.49	1
51.32	1	3400.41	1	60.00	1	98.76	1
51.68	1	03.75	1	60.30	1	98.85	1
52.45	1	04.27	1	61.51	1	3500.16	1
53.12	2	05.05	1	61.93	1	00.84	1
53.47	1	05.96	1	63.36	1	01.61	2
54.11	1	06.11	2	63.90	1	01.75	2
54.67	1	06.35	2	64.32	2	01.97	1
55.16	2	08.55	1+	64.99	1	02.80	1
56.55	2	12.45	1+	65.10	1	03.06	1
57.35	2	15.75	1	66.02	1	03.20	1
58.60	1+	16.70	1	67.10	1	06.40	1
59.49	1+	16.82	1	67.93	1	06.90	1
59.60	1+	16.99	1	68.26	1	07.49	1
60.70	2	17.55	2	69.07	1	08.11	2
61.95	2	17.99	1	69.15	1	08.62	1
64.19	1	19.05	1	69.55	1	08.86	1
64.50	1	20.32	1	70.30	1	09.40	1
64.98	1	22.62	1+	70.56	1	09.89	1
66.00	1	22.85	3	72.17	1	10.10	1
66.71	2	23.99	1	74.37	1	10.39	1
68.55	1	25.47	1	74.94	1	10.85	1
68.88	1	26.09	1	75.80	1	11.76	1
68.94	1	26.34	3	76.49	1	15.80	1
69.36	1	26.71	1	76.99	2	15.92	1
71.35	2	28.85	1	77.56	1	17.52	3
73.65	2	30.00	1	78.12	1	18.17	1
73.92	2	30.45	1	79.15	1	18.55	1
74.32	1	31.00	1	79.75	1	19.20	2
75.27	1	31.65	1	80.46	1	19.86	1
75.95	1	33.25	2	80.52	1	20.67	2
77.28	2	33.80	1	81.16	1	21.14	1
79.33	1	35.35	1	81.33	1	22.04	2
81.66	1	36.43	1	82.27	1	23.35	1
83.56	1	37.46	1	82.53	2	24.18	1
83.85	2	37.96	1	84.89	1	26.82	2
84.11	1	39.96	1	85.20	3	27.75	1
85.50	1	41.36	2	86.98	1	27.98	1

Bogen

Ce

3528·17	1	3569·45	1	3630·30	1	3673·79	2
28·76	1	69·98	1	30·56	1	74·23	1
29·16	1	71·14	1	31·35	2	76·27	1
30·16	2	72·56	1	32·25	1	79·26	1
30·75	1	73·85	1	33·53	1	79·55	1
31·07	1	76·35	2	36·20	1	80·05	1
31·75	1	77·59	3	37·65	1 d	80·20	1
32·75	1	80·73	1	37·88	1	80·28	1
33·03	1	80·95	1	38·14	1	81·01	1
33·76	1 d	83·78	1 +	38·40	1	81·54	1
34·20	3	84·50	1	39·68	1	82·24	1
34·57	1	86·93	1	40·84	1	87·95	1
35·71	1	87·38	1	41·67	1	88·80	1
36·65	1	87·79	2	42·75	1	89·30	1
36·86	1	88·28	1	42·95	1	93·59	1
37·31	1	88·59	2	43·58	1	93·85	1
37·60	1	90·78	2	44·45	1	95·05	2
38·94	1	93·33	1	45·35	1	96·09	1
39·24	3	94·22	1	45·59	1	96·23	1 +
40·98	1	96·26	1	46·79	2	97·80	1
41·83	1	96·88	1	47·10	2	98·26	1
42·07	1	97·39	1	47·68	1	98·50	1
43·45	1	98·35	2	47·91	2	98·79	1
43·68	1	3600·14	1	49·85	1	3700·06	1
45·75	2	00·74	2	50·28	1	02·95	1
45·98	2 d	01·94	1	51·05	2	05·15	2
46·34	2	04·34	2	52·25	1 +	07·09	1
46·80	1	06·28	1	52·43	1 +	07·54	1
47·15	2	07·77	2	53·25	2	07·78	1
47·96	1	08·00	1	53·80	2	09·46	4
48·30	1	09·85	3	55·05	2	10·09	4
48·98	1	11·06	2	55·96	3	10·84	1
51·61	1	11·50	2	59·37	2	14·12	1
51·86	2	11·87	1	60·10	1	14·93	1
52·25	1	12·55	1 + d	60·18	1	15·28	1
52·88	2	13·86	2	60·78	2	15·60	1
54·80	1	15·79	1	61·85	1	16·51	3
55·95	1	16·35	1	61·96	1	17·06	1
56·50	1	19·52	1	63·10	1	17·63	1
57·36	1	20·10	1	63·83	1	18·33	2
58·87	1	21·30	1	64·86	1	18·51	3
59·47	1	22·30	2	65·14	1	22·26	1
61·00	4	22·56	1	66·15	1	22·45	1
61·70	1	23·97	3	67·90	1	22·90	1 +
62·25	1	24·29	1	68·10	3	23·80	1
63·96	1	25·51	1	68·85	1	24·79	1
66·20	1	28·40	1	72·07	1	25·82	2
68·25	1	28·75	1	72·30	1	27·11	2
68·49	1	29·93	1	72·93	2	28·20	2 +

3728.57	3	3776.76	2	3829.50	2	3886.13	1
29.16	1	77.22	1	29.80	2	87.20	1
30.06	1	77.80	1	30.13	2	88.51	1
30.50	1	79.75	1	31.22	2	89.13	1
32.05	1	81.25	1	32.41	1	89.44	1
32.73	2 +	81.78	3	32.86	1	89.64	1
33.70	1	82.66	3	34.35	2	90.16	4
39.85	1 +	83.16	1	34.66	2	90.65	1
40.27	1 +	83.69	2	34.90	1	90.90	1
41.16	1 +	86.77	4	35.87	1	91.15	2
41.53	1 +	87.30	1 +	36.22	2	91.94	1
41.87	1 +	87.66	1 +	37.33	1	93.40	1
44.17	1 +	88.30	1	38.40	3	94.02	1
46.51	2	88.60	1 +	38.69	3	94.47	1
48.19	2	88.90	3	43.88	1	95.29	3
50.25	1	90.99	1 +	48.70	3	95.60	1
51.18	2	91.84	1	49.67	1	96.98	3
51.62	2	92.46	2	52.25	1	97.57	1
52.52	1	92.73	1	52.55	2	98.43	3
52.58	1	93.65	1	53.30	3	98.84	1
53.03	1	93.99	1 +	54.30	3	99.11	2
53.93	1	94.84	1	54.42	3	99.64	1
55.59	2	95.40	2	55.41	3	3900.35	1
55.89	2	96.30	1	56.48	1	01.45	1
56.44	1	96.81	1	56.77	1	01.80	1 +
57.38	1	97.06	1	57.11	2	03.50	2
58.00	1	99.21	1	57.35	1	04.08	1
59.30	1 +	3800.48	2	57.74	2	04.33	1
59.89	1	01.69	5	57.98	1 +	04.51	2
60.54	1	02.92	1	60.53	1	04.74	1
60.85	1	03.22	3	60.85	1	05.45	1
63.12	2	07.81	1	62.57	2	07.10	2
63.75	1	08.25	3	66.93	1	07.45	2
64.25	3	09.34	2	68.24	2	07.56	2 +
65.17	2	09.61	1	68.61	2 +	08.25	1
66.02	1	11.05	1	71.00	1	08.55	2
66.18	1	12.35	2 .	74.82	2	08.66	2
66.65	1	15.08	1 d	75.16	2	09.17	1
68.12	1 +	15.92	2	76.25	1	09.45	2
68.40	1 +	17.56	2	77.10	3	09.90	1
68.90	2	18.82	1	78.49	3	10.09	1
69.19	1	19.15	1	81.80	1	10.85	1
70.08	1	21.00	2 +	82.04	1	11.46	1
70.93	2	21.40	2	82.60	2	12.35	1
71.75	2	21.86	2	83.70	1 +	12.60	3
72.80	1	24.05	2	84.11	1	14.15	1
73.37	1	24.55	1	84.35	1	15.10	1
73.60	1	25.36	1	85.36	1	15.68	2
76.23	1 +	27.30	1	85.87	1	16.30	2

Bogen

Ce

3916.81	1	3952.77	8	3990.86	1	4030.54	2
17.05	1	53.80	2	91.48	1	31.51	4
17.40	1	54.10	2	92.30	1	33.95	1
17.78	1	55.51	2	92.55	3	37.53	1
18.42	3	56.07	1	93.06	2	37.81	2
19.95	3	56.17	1	93.33	1	38.40	2
21.91	3	56.45	3	94.00	3	40.04	1
23.29	3	57.05	2	94.75	1	40.92	6
24.81	2	57.33	1	95.59	1	41.43	1
24.95	1+	58.11	1	96.63	1	42.29	1
27.15	1	58.41	2	97.63	1	42.73	5
27.55	1	59.02	2	97.89	1	43.60	1
27.72	1+	59.76	2	99.42	5	45.40	3
28.78	1 Cr?	59.98	2	4000.89	1 d	46.49	3
28.88	1	60.55	1	01.23	1	47.41	2
29.27	1	61.09	3	01.72	2	48.50	1
30.14	1	62.25	1	01.91	2	49.16	1
30.95	1	63.55	1	03.00	1	49.95	1
31.24	3	64.35	1	03.13	1	51.00	1
31.53	2	64.65	2	03.36	1	51.56	2
31.98	2	67.21	2	03.93	3	52.15	2
32.29	2	67.31	2	04.75	1	53.66	3
33.13	1	67.70	1+	05.80	3	55.12	3 r
34.89	1	70.20	1	07.74	2	55.96	1
35.37	1	70.61	1	08.82	1	57.05	1
36.05	1	70.81	1	09.24	1	58.40	1
37.27	1	71.84	2	10.30	1	58.90	1
37.76	1	72.25	2	11.73	1	60.36	1+
37.95	1	73.23	1	12.34	1	60.64	1
38.20	3	74.15	1	12.57	5	60.88	1+
39.66	1	74.38	1	15.07	3	61.56	1
39.76	1	75.24	1	16.02	2	61.45	1
40.47	3	76.82	1 Cr?	18.75	1	62.39	2
40.75	1	76.88	1	19.20	1	63.10	2
41.09	2	77.67	1	19.44	1	64.10	1
42.31	5	77.94	1	19.60	1	65.06	1
42.86	3	78.80	3	20.05	1	65.32	1
43.26	1	80.10	1	20.70	1	66.69	1
43.60	1+	81.08	2	22.44	2	67.06	1
44.06	3	82.06	1	23.54	1	67.44	2
45.02	1	82.35	1	24.65	4	68.63	2
46.83	1	83.07	2	25.31	2	69.00	3
48.09	2	83.45	2	26.05	1	70.27	1
49.52	2	84.84	3	27.20	1+	71.01	1
49.94	1	86.30	1	27.82	1	71.27	1
50.57	1	86.56	1	28.57	4	71.96	3 (Fe)
50.96	1	89.59	2	29.44	1+	73.10	2
51.76	1	90.27	2	29.90	1	73.65	3
52.35	1	90.60	1	30.37	1+	73.96	2

81	1	4108-89	1	4145-16	4	4182-43	1+
87	3	09-71	1	46-39	3	83-37	1
95	3	10-54	3	48-34	1	85-50	3
41	2	11-02	2	49-05	2	86-78	10
202	1	11-56	3	50-11	10	87-48	3
61	2	12-10	1+	51-10	3	88-55	1
48	2	13-89	2	52-17	4	89-35	1
70	3+	14-30	1+	53-13	1+	89-80	1
18	1	15-07	1+	53-31	2	90-53	2
46	1	15-51	3	54-11	1	91-24	1
85	2	17-14	2	55-42	1	91-56	1+
60	2	17-44	2	55-71	2	92-95	1
70	2	17-73	2	56-15	1+	93-25	4
40	4	18-30	4	57-75	1+	93-45	3
40	3	19-16	2	58-25	1+	94-04	3
68	1+	19-99	8 d?	59-20	3	95-05	2
80	1+	21-00	3	60-32	2	95-99	1
41	3	21-75	1	61-34	2	96-49	4
56	2	23-40	2	62-00	1	96-71	1+
50	2	23-68	2	62-13	1	97-24	1+
73	1	24-03	4	62-46	1	97-69	2
73	1	24-98	3	62-80	2	97-82	2
92	2	25-60	1	63-05	1+	98-15	2
11	1+	25-90	1	63-70	3	98-57	1
93	1	26-80	1	64-16	1	98-84	5
99	1	27-52	4	64-45	1+	4201-41	3
36	2	27-90	2	64-71	1+	03-10	5
15	2	28-21	2	64-96	1+	03-66	1
92	1	28-43	2	65-29	1+	04-93	1
26	1	29-30	2	65-78	5	05-33	1
89	1	30-88	3	66-00	1	06-00	1
47	1	31-27	3	66-38	1	06-07	1
4	2	32-50	1	66-84	2	07-00	1+
31	1+	32-70	1	67-06	3	08-57	1
31	1+	33-98	3	67-98	2	09-56	2
98	1+	35-59	3	70-02	5	10-17	1
30	1	36-04	1	71-24	1	13-23	1
5	2	37-05	1+	71-59	1	14-20	3
1	1	37-63	2+	71-94	1+	17-40	1+
6	1+	37-81	4	72-30	1	17-74	3
3	3	38-25	2	74-64	2	19-87	1
4	1	38-51	2	75-40	1	20-95	1
0	1	39-60	1	76-15	1	21-35	1
6	2	39-98	1	76-25	1	22-78	10
0	1	40-66	1	76-87	2	24-05	1
5	2	40-94	1+	78-32	1+	24-80	1
9	3	42-57	3	79-27	1	25-90	1
6	1	42-99	2	79-46	1	27-90	3
0	1	44-67	3	81-28	2	28-45	1

4230.30	1	4270.34	4	4315.11	1	4349.55	1
30.70	1	70.89	3	15.54	2	49.95	6
31.91	2	71.91	3	15.81	1	50.70	1
32.24	2	73.60	3	16.13	1+	51.25	1
32.74	2	75.66	4	16.55	1+	52.89	4
33.37	1	76.48	1	17.47	2	53.60	2
34.37	2	77.83	1	18.13	2	54.05	1
34.89	1	78.39	2	19.21	1	54.62	1
36.52	1	79.01	3	19.80	1	55.05	1
37.30	1	80.30	3	20.89	4	55.60	1
37.98	1+	81.17	2	21.42	1	56.94	1
40.09	8	81.29	2	21.70	1	57.15	1+
40.75	1+	82.08	1	22.29	1	58.08	1
41.57	1+	83.16	2	22.96	1	59.25	2
42.16	1	83.70	1	24.25	1	59.79	1
42.43	1+	84.24	1+	24.79	1	60.35	2
42.89	4	85.52	4	24.97	2	60.64	2
43.94	1	86.65	1	26.65	1	61.54	1
44.70	1+	87.10	1+	26.98	2	61.84	2
45.10	1	87.76	1	27.95	1	62.60	1
46.08	5	88.80	3	29.00	1	63.26	1
46.55	1	90.07	4	30.10	1	63.60	1
46.87	3	90.77	1	30.60	4	64.31	1
48.24	1	91.08	1	31.12	1	64.82	8
48.79	8	92.77	2	31.93	3	65.53	1+
51.75	1	92.95	2	32.10	1+	65.72	1+
52.02	1	93.29	1	32.86	4	67.15	2
53.50	3	94.95	2	33.55	1	67.48	1
54.85	1+	96.23	3	34.43	1+	67.73	2
55.06	1+	96.52	1	35.01	2	68.40	2
55.51	1	96.88	10	35.61	2	69.06	1
55.91	3	99.52	3	36.41	4	69.41	2
56.30	3	4300.50	5	37.96	10	70.84	1
57.26	2	01.00	2	39.50	5	71.45	2
58.50	1	01.68	1	39.84	1	71.75	1
58.85	1	03.70	1+	40.70	2	72.03	1+
59.20	1	04.44	2	42.30	2	72.58	2
59.89	2	04.88	2	42.63	2	72.85	1+
61.31	2	05.29	3	43.70	1	73.41	2
62.95	1	06.89	5	44.01	1	74.00	5
63.60	3	09.89	5	44.44	1	75.34	2
64.12	2	10.55	1	44.64	2	76.09	8
64.52	2	10.85	3	45.06	1	77.02	1
64.83	1	11.74	3	45.60	1	78.71	1
65.85	1	12.72	1	46.08	3	78.96	1
66.1	1+	13.02	1	46.57	2+	79.25	1
67.36	2	13.26	2	47.80	2	80.25	3
68.45	2	13.75	1	48.35	1	80.50	1
69.40	3	14.64	1	48.72	1	80.89	1

4381.27	1	4413.36	2	4460.40	10	4498.02	3
81.96	2	13.96	2	61.31	5	99.41	1
82.32	10	17.05	3	62.19	1	99.70	1
84.60	1	18.12	1+	62.46	1	99.95	1
85.17	1	18.50	1	63.59	5	4500.52	2
85.48	1	18.92	8	64.05	1	01.26	1
85.65	1+	19.45	2	64.35	2	01.89	1
86.53	2	20.05	1	64.86	3	01.98	1
86.95	10	20.57	1	65.60	1	02.76	1
87.22	1	21.30	1	67.25	1	04.01	1
87.67	1	21.50	1+	67.50	1	04.24	1
88.16	3	22.28	1	67.71	4	05.29	1
89.28	1	23.60	2	68.20	1	05.76	1
90.00	1	23.83	3	69.35	1+	06.05	1
90.45	3	24.48	1	70.05	1	06.59	2
90.75	1	27.25	4	70.74	1	06.80	1+
91.00	1	28.10	4	71.41	8	07.20	1+
91.49	1	28.50	4	71.82	1	07.95	1
91.83	8	29.43	8	72.27	1	08.26	2
92.60	1	30.18	2	72.87	4	08.90	1
92.86	1	32.51	1	73.84	1	09.34	2
93.37	3	32.90	2	74.89	2	11.09	1
93.72	1	33.12	2	75.50	1	11.81	2
94.48	1	33.90	2	77.38	1	14.24	1
94.95	3	36.38	1	77.78	1	14.62	1
95.90	1	37.78	2	78.15	1	16.01	2
96.22	1.	39.40	2	79.52	10	16.45	1
96.34	1	39.66	1	80.15	1	17.26	1
96.76	2	40.29	1	82.09	1	18.16	1
97.43	1	41.05	3	83.00	1	18.44	1
98.05	1	41.79	1	83.54	1	19.74	2
98.95	3	42.59	1	84.06	4	20.57	1
99.39	4	43.91	3	84.98	3	21.3	1+
99.67	1	44.52	5	85.68	2	22.15	1
4400.31	1	44.88	8	86.59	1	22.26	1
00.70	2	46.30	2	87.06	10	22.70	1+
01.03	2	47.81	1	88.06	1	23.25	8
01.67	1	49.49	8	88.95	1	24.17	1
02.15	1	49.77	2	89.68	1	24.75	1
03.24	1	50.92	8	90.65	1	25.02	1
03.47	1	51.75	1+	91.50	1+	26.60	1+
03.73	1	52.72	2	92.53	1	27.51	10
05.65	2	53.33	2	93.15	1	28.12	1
07.45	3	55.10	2	93.42	1	28.64	10
09.02	2 (Pr)	55.83	2	93.63	1	29.41	1
09.46	1	56.05	1	94.41	3	30.06	1
10.84	8 d	56.71	1	95.55	3	30.98	1+
11.85	1	57.96	1	96.41	3	31.45	1
12.20	2	58.75	1	97.80	1+	31.79	1

4532-18	1	4563-53	1	4604-39	1	4657-21	1	+
32-64	2	64-03	1	05-06	1	57-40	1	
33-38	1	64-94	1	05-65	1	58-03	1	
34-36	1	65-42	2	06-59	4	58-21	1	+
34-92	1	66-02	4	08-65	2	58-55	1	
35-30	1+	67-30	1	08-92	1	59-59	2	
35-50	1+	67-56	1	10-63	1	60-13	1	
36-33	1	68-75	1	11-73	2	61-82	1	
36-79	1	69-30	1	12-15	1	63-40	2	
37-06	2	69-83	2	13-20	2	64-29	1	
38-06	2	70-26	1	14-40	1	65-46	1	
38-60	1	70-81	1	15-39	2	66-88	1	
39-23	2	71-65	1	18-25	1	67-52	1	
39-90	10	72-45	10	18-80	1	68-96	1	
40-81	1	72-95	2	19-13	1	69-69	2	
41-75	1	74-28	1	20-22	1	70-30	1	
41-93	1+	75-21	1	20-75	1	70-94	2	
42-24	1	75-94	1	21-9	1	71-40	1	
43-09	1+	76-62	2	23-65	1	71-60	1	
43-82	1+	76-96	1	24-40	1	71-89	1	
45-12	3	78-28	1+	24-53	1	72-43	1	
45-60	1	78-94	2	25-08	3	73-5	1	+
46-08	1	79-41	2	26-65	1	74-67	1	
46-21	2	80-19	1+	28-33	10	75-08	1	
47-00	1	81-25	1	30-97	1	75-48	1	
49-05	2	82-67	5	32-48	3	76-5	1	+
49-80	2	83-25	1	33-76	1	78-21	1	
50-49	2	84-31	1	36-90	1	78-79	1	
50-72	1+	86-10	1+	38-93	1	79-59	1	
51-49	3	88-56	2	40-35	1	80-30	3	
52-25	1	89-32	1	40-65	1	80-65	1	
53-26	1	89-55	1	41-05	1	81-19	2	
53-60	1+	90-36	1	41-24	1	82-09	1	+
54-72	1	91-29	2	42-46	1	83-21	1	
55-60	2	91-62	1+	43-31	1	84-79	4	
55-78	1+	93-06	1	43-95	1	85-39	2	
57-20	1	93-29	1	44-40	2	86-94	2	
57-57	1	94-11	10	47-42	1	87-79	1	
58-20	1+	96-27	1+	47-54	1	88-40	1	
58-77	2	97-13	1	49-00	1	89-07	2	
59-06	1	97-34	1	49-65	1	89-66	1	
59-36	1	97-95	1	50-07	1	90-35	1	
59-75	1	98-75	1	50-70	2	90-69	1	
60-44	5	99-20	1	51-49	1	90-95	1	
60-70	1	99-78	1	53-59	1	92-20	2	
61-13	4	4600-40	1+	54-48	3	93-80	1	
61-74	1	00-92	1	56-20	1	94-55	1	
62-52	10	01-55	1	56-36	1	95-06	2	
63-20	1	02-94	1	56-80	1	95-33	1	+

3	1 +	4735.50	1	4773.50	1 +	4812.67	1
5	1 +	3689	1 +	74.10	4	13.3	1 - + br
0	1	37.42	4	74.96	1	14.50	1
5	1	38.10	1 +	75.25	1	15.75	1
7	1	38.45	1 +	75.62	1	17.45	1
9	1 +	39.30	1	75.99	1	17.65	1
4	2	39.67	3	76.42	1	18.45	1
0	2	40.80	1	76.66	1	18.73	1
0	2	41.80	2	77.03	1	20.20	2
1 + br		42.22	1 +	77.40	1	20.79	2
9	2	42.40	1 +	78.44	2	21.35	1
5	1	43.43	1	78.95	1	22.29	1
3	1	43.65	1	81.90	1	22.71	3
6	1	43.88	1 +	82.41	1	25.93	1 +
0	1	45.09	3	82.97	1	26.45	1 +
4	2	47.31	3	84.15	2	29.20	1
2	2	48.40	1 +	84.95	2	29.76	1
0	1	49.05	1	85.36	1	30.00	1
2	1	49.40	1 +	86.72	2	34.20	2
4	1	49.68	1	87.34	1	35.45	1 +
0	1	50.41	1	88.45	1 +	35.81	2
8	3	51.03	1	88.60	1	36.84	2
1	2	51.60	1	89.00	1 +	37.61	1 +
5	1	51.72	1	89.40	1 +	38.60	1 +
0	1 +	52.48	1	89.83	1 +	39.11	1
4	1 +	52.77	1	91.85	1 +	39.79	1
3	2	53.82	1	93.32	1	41.0	1 - + br
6	1	55.69	2	93.51	1	41.87	1 +
0	1	56.30	1 +	95.40	2	42.46	1
0	1	58.01	3	95.75	2	43.20	2
0	1	58.71	1	97.59	1	44.41	1
3	1	60.10	1	99.55	1 +	45.65	3
9	2	61.00	1 +	4804.11	2	46.71	2
2	1	61.42	1	01.54	1	47.09	1
1	2	62.18	1	02.1	1 + br	47.97	4
8	2	62.55	1	02.7	1 - + br	48.45	1 +
2	2	64.10	2	03.27	1	50.07	1
9	3	64.66	1	03.77	1 +	50.39	1
5	1	64.95	1	04.15	1 +	50.90	1 + br
2	1	65.46	1	04.83	1 +	51.06	1 +
0	1	65.94	1 +	05.75	1	51.70	1
8	1	66.33	1	06.11	2	52.84	2
5	1	66.60	1 +	06.40	1	53.77	2
28	2	67.73	1 +	07.17	1	55.16	1
25	1	68.39	1	07.84	1	58.20	1 +
56	1	68.95	2	08.75	1 +	58.89	2
70	2	69.51	1	10.56	1	59.64	2
0	1 +	69.96	1	10.95	1 +	61.90	1
35	1 +	71.39	1	12.13	1	62.70	1

4863-38	2+	4953-90	1+	5066-06	1	5183-35	1
65-30	1+	54-28	1+	71-81	1-1	81-50	1
66-62	1+	55-56	1	71-95	2	88-80	1
68-80	1+	56-63	1+	75-47	3	89-40	1-1
73-10	1+	61-05	1+	76-63	2	91-82	3
74-18	2	61-68	1+	78-02	1	5200-03	1-1-1 br
74-53	1+	65-40	1+	79-86	3	00-57	1
77-78	1+	66-55	1+	80-66	1-1	01-56	1
81-70	1+	68-50	1+	84-35	1-1	02-70	1-1-1 br
82-65	4	70-81	1+	89-8	1-1 br	03-30	1
85-45	1+	71-65	2	91-93	1-1	03-67	1
86-35	1+	72-37	1+	93-56	1-1	10-52	1-1
87-3	1+ br	74-26	1	5108-5	1-1 br	12-08	2
89-75	2	77-32	1	11-76	1	22-10	1-1
91-48	1+	84-60	1+	12-86	2	23-12	1-1
92-01	1+	86-08	1	15-20	1-1	23-64	2
92-55	1+	87-75	1+	15-40	2	29-93	2
93-05	1+	88-85	1+	15-79	1	30-30	1
94-14	2	92-56	1	16-10	1-1	31-00	1
94-93	1+	94-85	2	17-34	2	34-17	1
95-8	1+ br	98-30	1	18-1	1-1 br	37-24	1
96-2	1+ br	5002-97	1	19-0	1-1 br	38-65	1
97-30	1+	05-00	1+	19-65	1-1	43-22	1
98-00	1+	09-25	3	20-95	1	44-64	2
98-37	1+	11-94	2	20-55	1	46-05	2
98-50	1+	12-65	1+	22-56	2	49-35	1-1
4900-09	2	13-93	1	22-85	1	49-75	1-1
01-85	1	16-67	1+	25-17	1	52-17	1-1
05-03	1+	17-18	1+	29-75	2	52-84	1-1
08-30	1+	21-60	2	34-63	1-1	53-60	1-1 br
08-90	1+	23-03	2	37-32	1	54-19	1
10-15	1+	25-3	1+ br	40-65	1-1	56-2	1-1 br
15-12	2	28-43	1+	47-75	2	58-65	1-1
15-48	2	31-90	1+	49-81	1	60-4	1-1
15-85	2	32-15	1+	50-15	2	65-83	2
20-07	1+	33-98	1	50-56	1	71-20	1
20-97	1+	36-77	1+	54-12	1-1	72-14	2
24-45	1	37-94	2	54-56	1-1	74-40	5
26-90	1+	39-95	1+ br	59-85	2	75-97	1
28-25	1+	41-02	2	61-65	2	76-40	1
29-9	1+ br	44-20	3	63-46	1-1	77-1	1
39-30	2	48-98	1	64-55	1-1	77-66	1
41-59	1+	51-16	1+	69-91	1	78-6	1
43-64	2	53-45	1+	74-75	2	78-93	1
44-05	1	53-70	1+	77-9	1-1 br	86-96	1
44-78	2	54-33	1	78-85	1-1	91-09	1
48-84	1+	55-95	1	81-05	1	91-40	1
49-70	1+	56-15	1+	81-95	1-1	92-64	1
52-20	1+	64-10	1+	82-08	1	94-21	1

5295.08	1 +	5395.48	1	5460.29	2	5532.24	1 +
96.75	2	95.95	1	64.41	2	33.45	1 +
98.40	1	97.85	2	65.55	2	33.76	1 +
99.30	1 +	98.21	1	68.56	4	35.45	2
5303.48	1	98.70	1	70.67	1 +	35.99	1 +
05.40	1 +	99.24	1 +	72.49	5	37.53	1 +
08.69	2	99.81	1	73.05	1	37.75	1
13.90	1	5401.40	1	73.73	1 +	40.76	1
14.08	1	06.84	1	76.51	1 +	42.30	1 +
14.55	1	09.48	4	77.61	1	42.95	1 +
15.06	1	10.26	1	78.81	1	43.95	1
16.07	1	12.03	1	81.35	1 +	44.84	1
17.76	1	14.35	1	81.55	1	46.73	1
18.25	1	18.04	1	82.20	1	47.10	1 +
23.47	1 +	18.91	1	83.65	1 + br	47.70	1 +
28.23	2	20.61	2	85.07	1	49.01	2
29.70	1 +	21.53	1 +	86.25	1 + br	50.26	2
30.74	4	22.47	1 +	90.60	1 +	50.87	1 +
32.55	1 +	23.67	1	90.90	1 +	51.67	1 +
35.90	2	26.63	1 +	91.30	1	51.93	1 +
36.39	1	26.77	1 +	91.85	1 +	52.55	1
37.93	1 +	27.49	1	95.98	1 +	54.56	1
43.44	1 +	27.78	1	96.44	1 +	56.48	3
43.98	1	28.50	1 +	98.39	2	57.14	3
48.00	1	29.08	1 +	5504.81	1	58.89	1
50.89	1 +	30.49	1	06.19	1	59.43	2
51.55	1 +	30.76	1 +	06.35	1 +	61.66	2
52.50	1 +	31.62	1	09.17	1 +	62.40	1 +
53.72	8	33.57	1 +	09.65	1 +	63.21	1
55.38	1	34.15	1 +	10.89	1	64.45	1
55.80	1	35.45	1	12.27	10	65.18	3
56.57	1 +	38.10	1	13.32	1	65.48	1
57.40	1	38.46	1	14.40	1 +	66.18	3
59.70	1	38.66	1	16.29	2	66.66	1
60.10	1 +	41.95	1	17.60	1	68.05	1
62.92	1 +	45.66	1	18.06	1	71.15	1 +
63.55	1	46.40	1 +	18.71	3	72.43	1 +
68.15	1 +	46.68	1 +	20.40	1	75.30	1 +
69.31	1	49.48	2	22.06	1	77.51	1
78.51	1	50.25	1	22.70	1	78.51	1
80.15	1	51.36	1	23.20	1 +	79.14	1
80.30	1 +	52.00	1	24.66	1	82.81	2
82.80	1	54.19	1	26.30	1 +	82.96	2
84.30	1 +	56.60	1	27.05	2	84.89	1
86.55	2	57.42	1	27.40	1	88.32	1
87.00	2	58.10	1 +	28.11	1 +	88.56	1
92.09	1	58.34	1	29.00	1 +	89.45	1 +
93.62	5	59.06	1	30.65	1 +	90.40	1 +
95.11	1	59.42	2	31.40	1 +	90.78	1 +

5593.95	1	5677.95	2	5772.21	1	5842.40	1+
94.95	2	79.23	1	72.45	1	43.37	1-+
95.21	2	80.48	1	73.18	1+	44.00	1
96.11	3	83.33	1+	73.40	3	46.20	1+
96.94	1	83.96	1	73.8	1+ br	47.94	1
98.20	1	85.15	1	75.29	1	48.57	1
98.55	1+	86.05	2	76.05	1	49.10	1
99.10	1	88.02	1	78.65	1	51.33	1
99.30	1	88.31	1	82.67	1	53.35	1
5601.52	4	88.67	1	83.05	1	53.58	1
04.41	1+	91.70	1	84.22	2	53.94	1
06.70	1	92.36	1	85.10	1	55.43	1
10.49	3	93.20	2	87.10	1+	57.36	1
10.73	1	96.07	2	87.45	1+	58.80	1
11.12	2	97.21	3	88.39	3	59.61	1
13.93	2	99.43	3	88.80	1	62.72	3
14.96	2	5702.53	1+	91.60	1	71.10	1-+
20.60	1+	03.44	1	91.95	1	71.82	2
23.23	1	11.69	2	95.06	1	78.3	1-+ br
23.98	1+	12.53	1	95.55	1+	79.2	1-+ br
25.45	1+	15.49	2	96.36	1+	81.95	1
26.94	1+	16.70	1	96.73	1	85.20	1-+
28.43	1	18.60	1+	97.69	1	85.60	1
30.59	1	18.81	1+	5800.06	2	86.53	1-+
32.70	1	19.26	3	03.07	1+	87.80	1-+
33.31	1	22.20	1	03.50	1+	88.74	1
34.66	1	26.06	2	04.12	1+	89.89	2
37.58	2	26.35	1+	04.71	2	90.11	1
38.37	2+	27.46	1	06.45	1	90.37	1
40.36	1+	29.60	1+	11.00	2	92.72	1
41.00	1+	30.70	1+	12.11	1	93.45	1
46.77	1	32.10	1+	13.19	3	94.56	1-+
50.82	1	33.50	1+	15.76	1+	95.2	1-+ br
55.36	3	34.15	1	18.06	1	95.57	1-+
56.40	1-+	35.90	1	19.1	1+ br	97.90	1
60.00	1	39.86	1	20.68	1	98.35	1
60.69	1+	43.78	3	23.29	2	99.96	1
63.41	1+	46.72	1+	23.75	1	5900.93	1-+
63.69	1+	49.68	1+	26.86	1+	01.60	1
64.19	2	58.38	1+	27.07	1	02.90	1+
64.90	1	58.50	1+	27.54	1+	06.25	2
65.56	1	60.39	1	30.45	1	06.57	1
68.17	1	60.81	1	31.69	1	09.53	1-+
69.11	4	61.17	1	32.21	3	10.13	2
70.18	4	64.95	1	32.59	1+	10.39	2
72.10	1	65.56	1	34.54	1	13.20	2
75.31	1	69.14	3	36.12	3	14.00	1+
77.08	1	70.19	1	38.40	3	15.09	1
77.46	1	70.64	1	39.64	1	20.68	2

5922.40	1	5987.30	1 +	6077.42	1	6163.47	1
23.24	2	87.60	1 +	77.80	1	64.68	1
23.84	1	89.63	2	78.71	1 +	64.91	1
24.31	1	91.14	1 +	79.56	1	65.70	1
25.19	1	91.90	1 +	80.65	1	75.03	1
26.56	2	92.95	2	81.54	1	78.20	1 +
28.60	3	95.54	2	82.34	1	78.58	1 +
29.00	1	95.70	1 +	86.90	1	80.32	1
29.78	1	97.29	1	89.16	1	82.5	1 + br
30.12	1	6000.45	1	89.6	1 + br	84.20	1
31.95	1 +	02.17	2 +	89.9	1 + br	86.40	2
32.45	1	03.90	1	93.50	2	86.90	1
33.84	1	06.12	2	93.85	1	87.16	1
34.62	2 +	07.05	2	97.2	1 + br	88.05	1 + br
37.98	2	07.60	1	97.9	1 + br	88.65	1
38.70	1	08.80	1 +	98.59	3	92.55	1
41.11	3	10.72	1 +	6100.06	1	95.50	1
41.80	2	11.84	1	00.36	1	95.79	1
42.16	1	12.21	1	03.05	1	96.58	1
42.94	1	13.66	2	04.30	1 +	98.29	1
43.80	1 +	16.80	1 +	05.12	1 +	6202.10	1
45.14	1	20.83	1	09.01	2	07.02	1 +
47.90	1	24.43	3	12.20	1 + br	08.53	1
48.45	1	27.37	1	18.80	1	09.21	2
50.52	1 +	29.38	1	19.15	1	09.79	1
50.87	1	29.90	1 +	20.08	1	11.30	1
51.49	1	30.91	1 +	23.94	2	12.75	1
53.10	1 +	31.47	1	24.57	1 +	13.70	1 +
57.08	1	33.84	1	25.25	1	16.32	1
59.96	2	34.45	2	26.36	1	17.05	1
61.00	1 +	35.72	1	28.10	1 +	20.85	1 +
61.28	1 +	43.60	3	28.78	1 +	21.03	1 +
63.60	1	45.66	1	30.41	1	21.60	1
64.90	1	47.65	2	32.30	2	22.55	1 +
66.42	1 +	52.12	2	33.83	1 +	23.51	1
66.58	1	52.89	1	35.75	1 +	23.82	1 +
68.30	1	56.72	1	39.25	1 +	25.70	1 +
68.85	1 +	57.70	2 +	40.00	1 +	28.47	1
71.00	1 +	58.28	2	41.53	1	29.18	2
71.35	1	59.50	1 +	43.14	1	31.70	1
72.35	1	60.96	1	43.57	2	32.70	3
74.10	1	66.98	1	46.68	1	37.68	1
75.51	1	68.90	1	48.07	1	38.95	1
76.10	4	69.72	2	49.80	1 +	41.70	1
78.70	1 +	72.25	2	51.95	1 +	42.18	1
79.62	1	72.58	1	57.02	1 +	43.16	1
81.45	1 +	75.79	1	57.92	1 +	44.20	1
82.08	1 +	76.16	1	59.2	1 + br	48.05	1 +
86.48	1 +	76.88	1	60.08	1	51.14	1

6253·87	1 +	6318·80	1	6403·40	1 +	6505·74	1 +
58·20	1 +	21·56	1	03·88	1 +	07·44	2
60·6	1 + br	21·90	1	13·11	1	09·30	1 +
62·32	1 +	29·65	1	15·70	1 +	13·90	2
64·52	1 +	32·26	1	25·53	2	17·53	1
66·42	1 +	35·65	1 +	30·31	1	37·75	1
70·10	1 +	37·45	1 +	33·64	1	52·00	1
70·52	1	38·57	1	33·75	1	55·90	1
72·28	5	40·12	1 +	34·67	1	61·08	1
74·00	1 +	40·9	1 + br	36·65	1	63·75	1
76·02	1 +	42·10	1 +	38·34	1	71·14	1
76·70	1 +	44·20	5	40·22	1 +	77·80	1 +
79·37	1 +	45·55	1 +	40·65	1 +	79·4	1 + br
81·80	1 + br	47·00	1 +	40·87	1 +	97·88	1 +
83·8	1 + br	48·55	1 +	42·26	1	6607·19	2
86·7	1 + br	49·00	1 +	46·35	1	10·05	1
93·6	1 + br	49·65	1	55·10	1 +	24·70	1 +
94·7	1 + br	51·55	1	58·29	2	29·15	2
95·80	2	53·8	1 + br	67·12	2	53·00	2
96·40	1	69·41	1 +	67·65	2	66·0	1 + br
97·3	1 + br	71·36	5	69·25	2	75·80	1 +
99·73	3	72·79	1 +	71·22	1	6700·95	1 +
6300·46	2	73·27	1 +	71·98	1	04·65	1 +
02·43	1	79·47	1 +	73·95	2	04·82	1 +
05·5	1 + br	79·90	1 +	74·29	1	06·3	1 + br
07·90	1 +	87·13	1 +	87·25	1	20·6	1 + br
08·25	1 +	90·60	1 +	91·23	1	29·0	1 + br
10·27	2	90·95	1 +	97·28	1 +	74·59	1
10·80	1	93·29	3	99·85	1		
12·85	1	96·58	1	6503·57	2		

Kanten.

3846·63	K. R.
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XV. Cl. Chlor.

Ältere Messungen: Fehlen.

Material: Verschiedene Chloride auf Gaskohle.

Linienzahl: 0.

XVI. Co. Cobalt.

Ältere Messungen: B. Hasselberg, Stockholm Akad. 28 (1896) L. Stüting,

Ztsch. für wiss. Phot. 7 (1909).

Material: Metall von C. Schuchardt.

Verunreinigungen: Cu, Fe, Mn, Ni, Ti, V.

Linienzahl: 1830.

2283·65	1 +	2352·97	1	2409·23	1	2464·58	1
84·96	1	53·51	2	10·60	1	64·71	1
86·25	2	54·58	1 +	11·73	3 u	67·80	1
87·91	1	58·29	1	12·97	2 +	70·38	1
91·57	1 +	61·61	1	13·30	1	73·02	1
93·50	1	63·89	2	13·69	1	74·01	1
95·37	1 +	65·12	1	14·17	2	76·73	1
96·19	1	69·76	1	14·55	3 u	83·70	1
96·82	1	70·02	1	15·22	1	85·44	1
98·48	1	70·60	1	15·40	3 u	86·53	1
2300·90	1 +	71·55	1	17·01	1	88·55	1
01·51	1	71·94	1	17·13	1	89·36	1
04·07	1 +	72·95	1	17·45	1	92·25	1
04·30	1 +	73·48	1	17·75	2	94·05	1
05·26	1 +	75·25	1	19·23	1	94·83	1
07·97	2	77·30	1	19·41	1 +	95·65	1
09·11	1 +	78·70	2	20·85	1	96·80	1
11·46	1	78·96	1	22·69	1	2500·60	1
11·73	2	80·60	1	23·73	1	04·63	1
13·75	1	81·90	1	25·06	3 u	05·2	1 +
14·15	2	83·55	2	25·68	1	06·55	2
15·07	2	84·97	1	27·10	1	07·26	1
16·20	1 +	85·90	1	28·49	1	11·12	2 +
16·96	1	86·46	2	28·67	2	13·01	1
17·23	1	87·55	1	29·30	1	13·20	1
20·12	1	88·25	1	30·25	1	17·90	2
21·49	1	88·48	1	32·28	3 u	19·90	1
22·02	1	89·01	2	35·19	3	21·03	1
22·80	1	89·63	2	35·91	1	21·49	3 u
23·26	1	90·09	1	36·51	1	25·09	2
24·44	2	91·51	1	36·66	1	28·67	2
25·63	1	92·07	1 +	36·85	1	29·06	3 u
25·90	1	92·72	1	37·05	1	30·22	1
26·23	2	94·01	1	39·11	1 +	30·65	1
26·55	2	96·32	1	41·15	2	31·45	1
29·20	1	96·90	1	43·00	1	32·26	2
30·05	1	97·12	1	43·63	1	35·45	1
30·45	1	97·37	1	43·89	1	36·02	2 +
36·06	1	97·45	1	46·60	1 +	36·55	1
36·30	1	2400·67	1	49·24	1	38·45	1
37·57	1	00·92	1	50·10	1	42·05	2
38·73	1 +	01·20	1	51·84	1	44·34	2
39·13	1	01·69	1	53·50	1	44·94	1
44·37	1	02·20	1 +	56·31	1	48·40	2
45·65	1	04·25	2	60·28	1	49·37	1
46·26	1 +	06·34	1	60·90	1	53·09	2
47·51	2	07·35	3 u	62·22	1	53·44	2
50·40	1	07·76	1	63·85	1	55·15	2
51·49	1	08·85	1	64·30	1	56·85	2

2559·48	2	2661·80	1	2818·69	1	2999·84	1
61·37	1	63·61	2	20·11	2	3000·66	2
62·22	2	69·65	1+	21·86	1	05·86	2
64·14	2	74·04	1	23·78	1+	06·10	1
67·42	2	76·06	2	24·50	1+	13·70	3
72·32	1	79·83	2	25·29	1	15·77	2
73·00	1	80·20	1	26·91	1	17·33	2
73·10	1	85·44	2	28·55	1+	17·66	3
74·45	2	94·50	1	34·02	1	19·23	2
74·94	1	94·76	1	34·55	1	20·05	1
75·82	1	95·93	2	37·26	2	22·47	2
78·99	1	2705·50	1	42·46	1	23·66	1
80·43	3	05·94	2	50·15	2	26·49	3
80·95	2	08·88	1	51·05	1	28·31	1+
82·35	2	16·05	2	59·75	1	31·43	1
85·45	2	19·65	1	61·48	1	34·55	3
87·30	2	22·20	1	62·70	2	38·42	1
90·70	2	28·86	1	67·57	1+	39·66	2
91·78	1	31·20	2	72·60	2	40·93	1
94·26	1	40·54	2	78·65	1	42·60	3
95·31	1	45·17	2	79·71	2	44·11	10 u
99·28	1	46·10	1	82·34	1	45·13	1 d (Ni)
2601·07	1	50·20	1	83·23	1	48·21	1
06·22	1	52·21	1	86·55	2	49·00	3
10·86	1	58·67	1	92·37	2	50·64	2
13·60	1	61·49	2	95·46	1	54·84	2
13·98	1	63·19	1	95·57	1	60·17	3
14·23	1	64·30	2	99·91	2	61·15	1
14·45	1	66·31	2	2903·30	1	61·94	5
15·45	1	66·47	2	04·40	1+	62·33	2
16·34	1	68·80	1	07·75	1+	64·49	2
17·95	1	72·8	1+	11·70	1	70·94	1
19·36	1	75·06	1	19·66	1	72·06	3
22·15	1	75·29	1+	27·78	3	72·45	4
22·35	1	75·67	1	28·91	2	73·64	2
22·54	1	78·92	2	29·62	3	79·49	3
23·54	1	86·00	1	43·60	1	82·73	3
23·85	1	90·40	1+	55·50	2	82·96	1+
27·13	1	91·13	1	57·79	2	86·46	2
27·71	2	91·57	1+	61·3	1+	86·89	4
30·05	1	92·55	1	69·7	1+	87·86	2
40·33	1	96·33	2	75·56	1	88·76	1
42·97	1	97·18	2	77·56	1	89·68	3
44·89	1	2803·87	2	78·10	1	90·36	2
46·51	2	04·25	1+	82·37	1	95·81	2
48·79	3	11·23	1	84·24	2 Ni?	96·50	2
50·04	1	11·64	1	87·28	3	96·80	1
50·40	2	15·06	1+	89·70	3	97·21	2
53·84	1	15·65	2	96·67	1	98·30	3

1	3171.30	1	3258.16	2	3308.96	2
2	71.51	1	58.58	1	12.33	3
3	73.30	1	60.03	1	12.99	2
2	74.29	1	60.45	1	13.27	2
2	75.06	2	60.99	3	14.21	3
1	77.40	3	62.47	1	14.46	1 +
1	79.98	1	63.35	2	15.20	2
2	80.42	1	64.96	3	18.60	1
1	82.25	3	65.49	2	18.55	2
2	86.05	2	68.15	1	19.31	2
2	86.46	2	69.04	1	19.66	3
2	88.50	3	70.35	2	20.00	3
1	89.87	2	71.92	3	22.06	1
3	91.44	2	72.56	1	22.41	5
2	92.35	2	76.60	2	24.99	1
1	93.30	2	77.44	2	25.44	4
2	95.74	1	77.80	2	26.72	1
3	98.3	1 +	78.23	1	27.14	4
1	98.79	2	78.96	3	28.34	2
2	99.44	2	79.39	2	29.16	1
3	3203.15	2	79.95	1	29.63	3
1	06.00	1	80.74	1	31.88	1
2	10.35	3	81.75	1	33.55	3
1	10.96	3 +	82.23	1	34.31	5
2	13.56	1 +	82.37	1	37.34	3
1	15.46	1	83.49	1	38.68	1
2	17.15	1	83.60	4	39.97	4
1	17.97	1	83.95	1	41.52	3
4 d	19.15	1 +	86.03	1	42.10	2
2	19.31	3	86.66	1	42.88	5
4	23.30	1	87.34	3	44.36	1
1	24.80	2	87.69	1	46.45	1
1	27.15	2	87.94	1	47.10	4
4	27.93	1	92.24	2	47.70	1
3	34.30	1	93.37	2	48.28	4
1	35.69	3	94.04	1	49.33	1
1	37.18	3	94.24	1	49.66	1
3	39.08	1	94.69	2	50.50	1 +
1	41.69	1	97.37	1	51.29	1
2	43.70	1	98.83	3	51.70	2
3	43.99	4	3304.03	2	54.84	1
1 +	45.42	1 +	04.29	2	54.51	5
1	45.86	1	04.95	1	55.27	1
4	47.13	2	05.27	2	56.06	1
3	47.32	2	05.87	2	56.59	2
3	50.17	3	06.54	1	56.97	2
1	51.84	1	07.31	3	58.13	1
3	53.60	1	08.11	1	59.20	1
3	54.37	4	08.65	2	59.42	3

3361·22	1	3417·32	10	3467·37	1	3518·50	10
61·72	4	17·84	2	68·74	1	20·23	4
62·93	3	17·93	2	69·11	2	21·73	3 u
63·41	2	20·64	2	69·80	1	21·85	2
63·89	2	20·95	3	71·53	3 r	23·00	2
64·38	2	21·77	2	72·34	1	23·55	4 u
65·13	1 +	22·63	1	72·85	1	23·83	3
67·25	5	22·92	1	73·60	1	26·00	1
67·98	1	23·03	2	74·17	10 u	26·97	10 u
68·72	1 d	24·67	3	74·40	2	28·09	2
70·48	4	25·93	1	74·68	2	29·19	5
73·40	3	26·60	2	76·50	2	29·96	15 u
74·13	2	27·90	1	78·00	2	30·70	1
74·42	3 d (Ni)	28·34	4	78·60	2	33·51	5
76·34	2	28·89	2	78·90	2	34·91	2
77·20	3	29·82	1	79·74	1	37·85	1
78·50	2	31·76	8	80·17	2	39·57	1
78·86	3	32·46	1	81·68	1 +	40·50	1 +
81·04	1	33·18	10 u	82·02	1 +	42·65	1
81·65	2	35·35	1 + d	83·29	1	43·15	1
82·20	1	35·87	1	83·58	4	43·43	5
83·07	1	37·10	2	85·51	4	44·25	1 +
84·09	2	37·83	4 +	85·85	1	45·08	1 +
85·38	4	38·83	2	87·45	1	46·85	2
85·68	1	39·05	3	87·84	2	48·60	3
87·19	1	41·28	2	89·57	20	50·36	1
87·56	1	43·06	3	90·89	3	50·78	5
87·82	1	43·31	2	91·49	4	51·84	1
88·29	5	43·79	15 u	92·12	1	52·90	2
88·80	1	45·29	1	95·83	5 u	53·16	3
90·54	3	45·56	1	96·20	1	53·31	2
90·92	2	46·21	3	96·80	3	58·93	3
95·07	1	47·43	2	96·90	3	59·75	1
95·55	8	48·49	2	97·49	1	60·47	2
96·61	1	49·26	10 u	3501·90	1	61·03	4 r
98·96	2	49·54	10 u	02·45	15 u	62·25	2
99·54	1	52·18	1	02·80	3 d (Ni)	63·09	2
3400·63	1	52·44	2	03·15	1	64·31	2
01·74	1	53·66	20 u	03·85	2	65·09	5 r
02·14	4 u	54·35	1	04·89	2	68·56	1
03·33	1	55·33	3	05·29	2	69·59	20 u
05·27	20 u	56·58	1 d	06·47	10 u	70·57	2 +
07·02	1	57·05	2	07·75	1	75·13	4
09·05	1	58·16	1	10·00	8	75·53	5
09·29	10 u	60·86	1	10·59	5 r (Ni)	77·39	1
12·50	10 u	61·33	4	12·80	10	77·82	1
12·79	10 u	62·94	10 u	13·61	4 u	78·21	2
13·00	1 +	63·62	1	16·55	1	79·04	2
15·66	1	65·96	10 u	16·78	1	79·15	2

2	3652.70	4	3777.68	2	3908.70	1 +
2	54.59	3	83.87	1	10.13	5 r
4	57.10	3	3805.94	2	15.65	1
1	58.06	2	06.87	2	17.80	5
1	60.85	1	08.25	3	19.77	1
15 u	62.32	4	11.23	2	20.32	1
1	64.7	1 + br	12.62	2	20.75	1
1	68.80	1 +	14.62	2	20.90	2
2	70.20	2	16.48	3	21.27	1
8	74.08	1	16.61	3	22.90	4
2	76.72	5	17.01	2	24.68	1
1	83.22	8	18.10	1	25.33	2
10	84.63	3	20.08	2	29.43	2
2	85.11	1	23.66	2	33.32	1
2	86.62	1	33.05	1	34.07	2
4	90.91	2	35.84	1	34.85	1
1	93.29	3	36.05	1	35.44	1
2	93.63	5	41.60	2	36.13	10
4	99.15	1	42.21	8	38.11	1
3	3702.39	5	43.85	2	39.00	2
2	03.73	1	45.60	20 u	39.21	1 +
2	04.22	5	50.27	1	41.06	5
1	07.62	2	51.09	2	41.91	5
2	09.00	4	52.00	2	42.84	1
1	11.83	1	56.94	2	44.55	1 +
3	12.35	2	61.31	5	45.07	1
1	26.79	2	63.75	2	45.51	6
5	28.96	2	66.97	1	46.75	2
1	30.63	5	70.66	2	47.26	2
1	31.42	1	73.23	10 u	51.89	1
5	32.59	5	74.09	10	52.46	2
1	33.65	4	77.01	5	53.10	8
3	34.30	3	82.06	5	55.14	1
1	36.08	4	84.79	3 r	56.42	1
3	39.34	1	85.45	2	56.74	1
3	39.65	1	90.18	1	57.75	1
2	40.34	2	90.90	1 +	58.10	4
1	45.65	4	91.85	1	58.73	1
3	50.07	3	92.30	2	61.15	3
3	51.75	3	93.20	2 +	65.15	1
3	52.32	1 +	93.45	2 +	65.37	1
2	52.93	1	94.25	15 u	68.75	1
1	54.47	2	95.15	4	69.28	3
2	55.60	3	98.54	2	72.69	4
1	56.44	1	3904.23	2	73.31	5
3	59.83	2	04.94	1	74.90	4
2	60.55	2	05.70	2 Si?	75.45	2
4	74.75	3	06.46	3	77.34	2
2	77.25	1	08.55	1 +	77.89	1

3978.78	3	4059.07	1	4156.59	1	4255.38	1
78.99	2	61.91	1	57.07	1	57.80	1
79.67	4	63.34	1	58.59	2	60.05	1
85.20	1	66.56	5	60.78	1	63.91	2
85.60	1	68.72	4	62.32	3	67.34	1
87.25	3	69.71	1	67.77	1	68.20	1
89.00	1	70.47	1	68.01	1	68.61	2
90.45	3	76.30	3	68.60	1	70.60	1
91.68	2	76.73	1	71.12	2	75.27	1
91.83	3	77.56	2 d ?	72.30	1	76.24	2
91.95	2	79.41	1	72.78	1	84.84	1
92.50	1	79.57	1	76.20	1	85.92	3
94.70	2	81.64	1	77.75	1	87.50	2
95.45	20 u ¹⁾	82.75	2	79.34	2	88.15	1
97.20	1	83.08	2	80.87	1	88.70	1 +
98.09	10	83.78	2	84.66	1	89.85	1
98.69	1	84.27	1	87.46	2	90.37	1
99.33	1	85.74	1	89.66	1	92.10	1 +
4003.85	1	86.49	10	90.88	5	92.40	2
07.40	1	87.07	1	92.99	1	96.05	1
08.07	1	88.45	1	95.03	1	98.08	1
11.10	1	92.56	8	98.00	1	4300.37	1 +
11.25	1	93.03	1	98.56	1	00.69	1 +
12.32	1	93.22	1	4201.24	1	01.20	2
14.09	4	96.11	2	06.31	1	03.41	3
15.35	1	97.36	1	07.76	1	06.05	1
16.95	1	99.97	1	08.65	1	06.56	1 +
19.45	2	4104.57	2	08.90	1	07.58	2 +
21.07	8	04.91	2	10.22	1	09.61	2
23.55	3	08.49	1	15.03	1	10.25	2
25.60	1	08.63	1	20.44	1	13.58	1
26.58	1	09.84	1 +	20.7	1 + br	18.15	1 + br
27.18	4	10.23	1 +	21.25	1	20.53	2
35.74	8	10.70	10	23.94	1	22.57	1
37.33	1	15.30	1	25.28	2	24.48	1
40.75	1 +	18.96	10	28.70	1	26.56	1
40.95	1	21.52	20 u	29.00	1	31.43	3
44.03	1	22.43	2	30.10	1	31.80	1 +
45.56	8	28.20	1	34.15	2 d ?	33.30	1
49.43	1	32.00	1 +	37.16	1	34.53	1
53.10	3	32.30	3	37.50	1	37.70	2
54.08	2	39.60	2	38.53	1	39.19	1 +
54.79	1	40.55	1 + br	40.95	1	39.80	4
55.71	2	46.9	1 + br	41.69	2	40.40	1
57.10	2	50.62	2	42.03	2	41.35	1 +
57.36	3	51.35	1	45.70	2	42.63	1
58.36	4	51.90	1	48.30	2	50.27	1 +
58.76	3	53.37	1	52.48	3	50.81	1 +

¹⁾ Rote Komponente stärker.

07	2	4422·17	1	4517·26	4	4601·40	2
03	2	27·08	1+	18·13	1+	06·43	1+
00	1	29·50	1+	19·45	2	07·45	1
25	1	31·79	2	25·96	1	09·07	1
13	1	36·49	2 d? (Mn)	26·95	2	12·59	1
60	2	38·05	1	28·08	3	14·18	2
02	2	41·19	1+	31·12	15	18·20	1+
25	1+	42·15	1	32·76	1	20·98	2
10	2	45·22	2	33·35	1	22·82	2
70	1+	45·90	3	34·18	5	23·20	3
40	2	50·96	1	34·92	1	24·71	1
20	1	52·30	1	40·19	1+	25·91	3
25	1	56·00	1	40·96	2	27·62	1
31	3	56·77	1	41·82	1	29·03	2
25	1	58·74	2	43·99	5	29·58	10
81	5	59·92	1	44·71	1	30·70	1+
60	2	60·48	1	45·40	2	31·28	1+
11	3	60·90	1	46·15	2	34·16	1
70	2	64·84	2 Mn?	47·05	1	34·94	1+
43	1	65·98	2	49·89	6	39·25	1
45	2	67·09	5	52·63	2	41·01	2
29	4	67·70	1+	53·53	2	42·97	1
67	1	69·75	5	54·38	1	43·95	2
91	1	71·76	3	59·31	1	44·52	2
27	1+	72·00	2	61·15	1+	45·35	1
08	2(Fe)	74·20	1	61·40	1+	51·30	1+
39	1	74·36	1	62·12	2	52·70	1
17	1	77·40	2	63·20	1	53·96	1
78	2	78·50	3	63·56	1	55·02	2
11	2	78·82	1	64·14	2	55·79	1
20	1	80·13	1	64·35	2	57·60	2
71	1	81·80	1	64·99	2	63·60	10
44	1	83·76	2	65·79	8	68·55	2
09	2	84·11	3	66·80	2	71·10	1
81	1	84·72	2	70·20	5	76·91	1
86	4	86·90	2	73·94	1	77·48	1
45	1	89·00	1 + br	75·11	2	77·73	1
08	2+	89·57	1	77·40	1+	80·62	1
80	1	92·26	1	79·53	2	82·55	10
27	1	92·86	1	80·34	3	84·13	1
19	1+	93·22	1	81·15	1	86·01	2
85	1+	94·94	3	81·80	10	87·15	1
91	1	98·13	1	87·11	1	88·66	2
63	2	99·45	1	88·90	2	90·16	1+
55	3	4500·74	1	89·54	1	93·36	8
93	1	11·79	1	91·59	1	97·18	1
60	1	13·1	1 + br	92·78	1	97·70	1
03	1	14·35	3	94·82	10	98·56	3
51	3	16·05	1 + br	97·10	10	99·33	2

4704.31	3 +	4858.18	1 +	5034.20	1	5219.20	2
09.22	1 +	62.30	1	35.11	1 +	22.67	2
18.68	2	63.65	1	55.95	1 +	30.40	8
21.62	1	68.08	10	60.00	1 +	34.84	1
25.42	1	69.60	2	67.73	1	35.32	6
28.61	3	72.95	1 +	77.01	1 +	37.20	2
32.26	2	80.40	1	77.57	1	43.20	1 +
35.01	3	82.89	3	87.97	1	48.02	6
36.40	1 +	92.67	1	95.13	2	50.12	3
37.92	3	92.98	1	98.20	1 +	54.78	4
38.30	1 +	97.83	2	5100.20	1	57.75	5
42.40	1 +	99.70	3	05.70	3	62.14	1
42.73	1 +	4902.70	1 +	08.45	1	64.40	1
46.30	2	04.38	3 r	09.02	3	65.00	1 +
49.89	10	07.30	1	13.39	2	66.00	3
51.75	1	07.76	1	22.93	3	66.66	10(Fe)
54.60	3	08.63	1	24.89	2	67.93	1
56.89	3	12.58	1	25.84	3	68.70	4
61.02	1 +	20.40	1	26.36	3	69.70	2(Fe)
67.35	2	25.10	1 +	33.60	8	76.32	4
68.26	3	28.47	3	41.20	1 +	80.80	8
71.30	5	33.04	1	42.65	1 +	83.60	2
73.70	1 +	35.39	1	45.63	2	84.25	1 +
76.51	4	36.55	1	46.89	4	85.50	1 +
78.42	3	41.53	1 +	49.21	1	86.65	1 +
80.20	4	41.83	1 +	49.93	2	87.83	5
81.64	3	42.52	1 +	53.37	1	92.34	1
82.78	1	43.43	1 +	54.20	3	5301.20	5
85.28	2	44.90	1	54.99	1 +	07.40	1
93.10	10	45.73	1	56.49	3	10.33	2
94.45	1	48.71	1	58.57	2	12.80	4
96.06	2	52.00	1	59.00	2	16.90	4
96.60	1	53.32	2	65.30	2	21.89	2
98.00	2 d?	59.83	1	66.27	2	25.40	4
4801.97	1 +	66.72	2	72.43	1	26.06	2
07.22	1 +	67.65	1	76.22	5	26.39	2(Fe)
08.42	1 +	68.05	1	77.62	1 + br	28.20	3(Fe)
13.70	8	71.18	1	79.83	1	31.62	4
14.22	2	72.09	2	80.30	1 +	32.85	3 +
16.09	2	74.65	1	83.21	1 +	33.82	3
17.61	1 +	80.11	2	83.70	1 +	35.02	3
18.50	1 +	81.94	1	92.53	3(Fe)	36.30	2 +
21.76	1 +	86.60	1	5201.35	1	37.45	1
32.30	1 +	88.10	3	10.20	2	39.61	2
40.50	10(Fe)	93.20	2	10.97	2	41.34	5
43.68	3	5001.05	1 +	11.91	2	42.89	10
45.22	1	13.50	1	12.85	8	43.58	8
55.48	1 +	22.34	1	14.91	1 +	44.71	2
57.60	1 +	33.50	1	18.34	2(Ni)	47.63	3

Co

Bogen

3	3	5489.81	5	5695.13	1 +	6002.70	1
0	10	95.90	3	97.00	1	05.22	3
9	10	5503.40	1 +	5703.29	1	06.50	20
0	1	06.73	1	06.30	1	07.85	20
2	10	08.55	1 +	21.0	1 + br	11.64	1
5	10	16.12	2	34.48	1 +	15.54	1 +
2	2	16.94	1 +	38.19	1	30.86	1
0	2	23.51	8	41.20	1	49.34	20
9	2	24.20	1	51.21	1	58.45	2
3	10	25.23	8	53.15	1 +	70.80	8
0	1	25.87	1	54.28	1 +	82.67	20
4	1	27.35	1	70.62	4	83.49	1 +
3	1	30.99	10	74.59	1 +	86.84	8
0	1 +	33.26	1	90.30	2	93.35	8
6	1 +	36.45	1	93.4	1 + br	6100.92	2
1	3	44.50	1 +	94.2	1 + br	05.69	3
2	4	46.60	3 +	5806.60	1 +	08.12	6
2	2 +	47.19	2	18.40	1 +	17.20	6
5	1 +	59.02	3	26.51	3	22.90	10
2	1	63.95	1 +	30.32	8	28.44	2
8	2	66.10	1 +	35.8	1 + br	29.27	3
0	4	70.62	1	46.78	3	32.60	3
0	2 (Fe)	73.87	1 +	76.28	3	43.97	2
0	4	76.25	1 + (Fe)	77.61	3	46.56	1
5	2	81.50	1 +	78.30	2	58.70	1
3	3	89.49	1 Ni?	81.32	2	60.20	1
1 + br		90.99	8	83.65	2	69.03	1
9	1 +	92.42	2	86.82	1 +	75.20	1
2	2	94.95	1	90.71	10	76.89	1
5	1	5602.48	1 +	5905.80	2	81.22	3
5	1 +	06.97	1 + br	15.74	10	89.20	10
2	2	16.27	2	17.02	1	91.40	2
2	3 (Fe)	28.00	1 +	22.62	1	93.78	3
7	3	36.30	3 +	23.36	1 +	98.00	1 +
0	15	36.65	1 +	35.61	8	6203.45	1 +
4	1 +	37.91	2	40.72	1	03.87	1 +
3	1 +	40.22	1	46.73	15	05.7	1 +
3	3	42.71	1 +	52.00	1	11.34	8
4	1 +	43.30	2	65.26	2	22.52	1
1	10	47.47	10	65.90	1	23.58	3
6	1 +	52.00	1 +	82.21	2	31.20	10
9	3	59.36	3	83.54	1	32.70	3
9	3	75.69	1	84.40	20	37.35	1
0	2	76.74	1	89.78	1	46.60	2
0	1	79.85	1 +	90.65	1	47.41	5 +
6	1	82.50	1 +	92.11	15	49.70	8
9	10	87.26	1	93.77	1	52.79	1 +
9	5	88.40	1	97.02	3	54.18	1 +
4	2	88.82	2	6000.91	10	56.58	2 Ni?

6257·20	2 +	6333·90	1 +	6430·51	4	6579·50	1 + br
57·81	10	38·17	2	31·29	1 +	92·07	1 + br
63·03	1 +	41·01	2	44·89	4	96·17	10
71·60	10 +	48·00	20	50·51	30	6617·30	2 +
72·10	1 +	51·66	5	51·38	8	17·70	1 +
73·28	10	52·99	1	55·30	30	24·00	2
75·38	3	74·73	1 +	63·19	3	32·69	5
76·84	3	86·88	3	70·33	1	35·34	1
82·89	20	95·40	10	74·73	3	79·03	2
92·09	2	96·71	3	78·10	15	84·3	1 + br
97·15	1 +	6407·67	1 + br	83·04	1	85·1	1 + br
6311·52	3 + r	08·60	1 + br	90·50	5	6771·29	5
13·28	4	14·88	1 +	6504·44	2	6815·20	4
14·70	6	17·99	10	17·20	1 +	72·62	3
20·62	20	21·91	3	35·3	1 + br	7016·82	1
23·19	1 +	25·31	2	51·69	3	53·11	2
27·90	1 +	30·10	4	63·61	10	85·25	2

XVII. Cp. Cassiopeium.

Ältere Messungen: J. M. Eder und E. Valenta, Wiener Ber. 119 II a. (1910) (Rot).

Material: Cassiopeiumnitrat von C. Auer v. Welsbach, auf Gaskohle.

Verunreinigungen: Ad.

Linienzahl: 164.

2392·26	2	2754·29	5	2955·85	1	3183·86	2
2441·74	1	65·83	3 ¹⁾	60·50	1 +	91·90	3 d?
69·37	1 ¹⁾	96·76	5	63·49	15	98·27	20
81·77	1 ¹⁾	2834·48	2 d ¹⁾	69·98	10	3242·09	1
2537·04	1 ¹⁾	45·22	3 ¹⁾	70·70	3	54·45	20
71·32	3	47·60	8	89·40	5	79·09	15
78·89	4	51·22	1 Ad	3027·41	2	80·59	1
2613·50	3	59·92	1 Ad	31·23	1 Ad	80·70	1
15·50	20 u	85·25	3 ¹⁾	56·86	15	81·89	20
19·35	3	91·50	3 Ad	63·62	2	86·15	1
53·85	1 Ad	92·01	1 +	75·36	1	89·50	15 Ad
57·15	1	94·99	15	77·75	30	3312·30	20
57·92	4	2900·48	15	80·24	3	15·55	1
85·19	3 ¹⁾	03·17	2	80·80	1 + ¹⁾	59·74	30
85·64	1 +	08·61	1	81·60	10	63·06	1 +
2701·80	5	11·53	20	88·14	1	75·62	1 + Ad
16·00	1 + Ad	12·78	1 +	3118·48	8 ¹⁾	76·69	20
29·05	2 ¹⁾	49·85	2 ¹⁾	53·30	1 +	80·00	1
50·59	1 Ad	51·81	4	71·49	5 ¹⁾	85·64	15

¹⁾ Gehört nach G. Urbain, C. R. 152 (1911) einem neuen Element Celtium (Ct) an.

Cp, Cr

Bogen

8 ¹⁾	3647.93	5 (Fe)	4450.99	3	5349.32	1
8	80.03	3	4518.74	20	5402.78	10
30	84.49	5	91.00	1 + Ad	22.10	3
1	94.33	30 Ad	94.20	1 +	38.08	2
1 + Co?	3797.37	2	4645.67	3	76.88	50
1	3841.30	8	48.40	3 +	5535.71	2 Cp?
1	43.74	2	49.00	3 +	56.69	1
1	53.47	2	54.25	2 + Kante?	5736.75	8
1 Ad?	71.0	2 + br	56.65	1 +	75.60	2 +
4 Ad?	71.50	2 +	58.22	15	5800.80	1 +
30	76.80	20	59.22	3	5983.92	20
1	3988.14	15 Ad	74.00	2 +	84.32	20
1 Ad	91.03	1 Ad	75.50	3 +	97.36	1 +
1 Ad	4054.62	5	76.30	2 + d	6004.77	15
50	4112.80	2 +	83.80	2 +	55.29	3
20	22.62	2	4726.29	1 + Ad?	6160.18	3
3	24.87	20	85.62	5	99.94	2
5	54.20	4	4815.24	3	6222.10	100
2	84.40	50	39.61	2 +	28.36	1 +
30	4277.68	4	39.75	2 +	35.59	2
20	81.19	5	39.89	2 +	42.59	3
2	96.19	5 d	4905.08	5	6345.6	1 + br
1 Ad	4306.10	1 Ad?	42.51	3	6462.86	2
2	09.76	4	94.30	15	63.40	50
20	32.91	1	5001.29	10	6945.30	1 +
20	42.20	1	5135.28	15		

Kanten.

K. R.	4684.40	K. R.	4721.15	K. R.	4769.50	K. R.
K. R.	95.70	K. R.	35.20	K. R.	5196.80	K. V.
K. R.	4708.20	K. R.	49.35	K. R.	5206.68	K. V.

XVIII. Cr. Chrom.

essungen: B. Hasselberg, Stockholm Akad. 26 (1894). L. Stü-
Ztschr. für wiss. Phot. 7 (1909). J. M. Eder und E. Valenta,
er Akad. 119 II a (1910) (Rot).

Metall von Prof. H. Moissan.

nnigungen: Ca, Mg, Mn, Ni, Pb.

hl: 1697.

1	2364.82	2	2366.25	1	2367.98	1
1	65.24	1	66.40	1	68.58	1
1	66.04	1	66.93	2	70.49	1

ört nach G. Urbain, C. R. 152 (1911) einem neuen Element Celtium (Ct) an.

2373.00	1	2553.15	2	2681.51	1	2766.66	4	
73.80	1	57.24	2	87.17	3	67.64	1	
78.10	1+	60.80	2	88.13	2	70.01	6	
80.00	1+	66.65	1	90.36	1	71.56	1	
83.37	2	68.18	1+	91.16	3	75.80	1	
85.80	1+	68.62	1+	96.65	1	77.78	1	
86.25	1	71.85	2	98.00	1	78.20	1	
89.50	1	72.23	1	98.50	3	80.83	8	
92.47	1	77.75	2	98.77	3	81.27	1	
92.96	1	78.36	1	2700.68	1	88.00	1	
95.86	1	79.25	1	02.05	2	88.25	1	
96.45	1	83.13	1+	02.60	1	90.40	1	
99.14	1	84.73	1	03.57	1	95.94	1	
99.65	1	88.30	1	03.85	1+	2800.87	1	
2408.74	2	91.96	3	04.83	1+	10.04	1	
08.83	1	2603.66	1	05.50	1	11.30	1	
74.16	1	08.50	1	05.80	1+	12.13	1	
79.25	1	10.40	1	10.3	1+ br	14.65	1	
91.43	2	12.13	1	12.40	2	16.80	1	
92.64	2	12.30	1	16.25	2	18.56	1	
95.15	1	13.41	1	17.55	1	20.95	1	
96.40	2	18.37	1	22.85	2	22.15	1	
99.95	1	19.58	1+	26.59	5	22.48	2	
2500.75	1	20.09	1	27.36	1	26.83	1	
02.64	2	20.56	1	32.00	5	28.28	1	
04.40	2	20.94	1	36.53	4	30.59	1	
07.43	1	22.96	2	37.37	1	31.14	1	
08.21	1	25.44	1	39.47	2	35.75	4	
09.08	1	26.68	1	40.20	1	38.58	1	
10.70	1+	d	29.92	1	41.17	2	39.13	1
12.07	1	38.98	1	42.12	2	40.13	1	
13.71	1	39.55	1+	42.25	2	41.03	1	
16.99	2	42.23	1	43.21	2	43.03	1	
17.65	1	53.67	3	48.36	3+	43.35	4	
17.96	1	58.70	3	49.09	3	46.10	1	
18.15	1	61.84	1	50.85	3	49.40	2	
18.80	2	63.51	3	51.70	1	49.94	4	
19.61	2	63.78	1	51.99	3	51.47	1	
27.20	2	66.12	3	52.97	3+	54.01	1	
28.11	1	68.81	3	55.00	1	55.34	1	
28.32	1	69.49	1	55.38	1	55.79	3	
29.23	1	71.90	3	56.86	1+	56.85	1	
30.54	1	72.10	1	57.22	4	57.50	1	
34.41	1	72.93	3	57.83	3	58.85	1	
41.46	2	73.75	1	59.50	1	59.01	3	
41.75	1	77.24	4	61.85	3+	61.05	3	
45.30	1	78.24	2	62.71	3	62.70	3	
45.73	2	78.85	3	63.17	1	65.21	3	
49.60	2	80.39	1	64.49	3	65.45	1	

3	2935.65	1	3029.30	3	3111.01	3
1	42.00	1	30.38	3	11.46	1
3	46.93	1 +	31.46	2	13.10	1
2 + d	49.0	1 +	31.55	1	14.56	1
2	53.47	1	32.99	1	14.97	1
1	56.41	1	34.27	3	15.63	1 +
1	59.16	1	37.12	3	18.21	1
2	61.85	1	39.43	1	18.77	3
1	62.50	1	39.87	2	19.31	2
2	63.80	1 + br	40.99	4	19.80	2
2	66.15	1	43.54	1	20.50	2
2	67.79	3	43.77	1	20.82	1
1	69.10	1	46.21	1 +	21.75	1 + br
3	71.22	3	46.66	1	22.31	1
1	72.00	1	47.56	1	23.10	1
2	75.55	3	49.92	1	25.10	3
3	79.85	1	50.23	1	25.97	1
1	80.92	3	52.30	1	27.66	1
5	84.15	1	54.00	8	28.73	2
1	85.44	1	55.07	1	31.30	2
1	85.97	2	56.50	1	32.19	4
2	86.10	2	58.23	1	32.95	2
3	86.22	2	59.60	1	35.05	1
2	86.61	3	61.80	2	36.00	1
1	88.72	3	61.93	1	36.77	2
1	89.28	1	65.17	2	37.72	1
2	92.01	2	71.15	1	38.31	2
2	94.15	2	71.42	1	41.96	2
1	95.21	3	73.80	2	43.80	1 +
2	96.70	3	76.29	1	44.52	3
1	98.22	1	76.66	1	45.70	2
1	98.91	3	77.91	2	47.31	2
1 +	3001.01	3	80.84	1	48.53	3
1 +	03.85	1	84.65	1	52.31	1 +
1	05.19	3	86.86	1	53.01	2
2	11.20	1	87.61	1	53.65	1
2	13.12	2	94.40	1 +	55.27	3
2	13.80	3	95.46	2	58.97	1
2	14.90	3 d	95.93	2	59.70	4 +
2	15.04	2	96.15	1 +	63.87	3
1	15.29	2	96.60	1	64.60	1
1	17.62	2	96.77	1 +	67.65	1
1	17.69	2	99.56	1	68.87	1
1 +	18.57	2	3103.53	1	69.67	1
1 +	18.92	2	04.80	1	77.73	1
1 +	20.76	2	05.66	1	79.35	2
1	21.68	3 d	05.95	1	80.82	3
1 +	24.47	4	07.35	1 + br	81.54	1
1	24.76	1	09.41	2	85.46	1

3188.11	5	3296.95	1	3349.41	2	3427.80	1
92.23	1	97.42	1 +	51.70	2	31.41	2
94.11	1	98.40	2	52.10	2	32.10	1
97.20	2	3300.90	1	53.19	2	32.44	1
98.19	1	02.30	2 +	53.74	1	32.96	1
3208.64	1	02.96	1	56.53	1 +	33.43	2
09.29	2	04.47	1 + br	56.87	1 +	33.74	4
11.38	2	05.30	1	57.55	1	34.23	1
17.48	2	07.83	2	58.68	2	35.60	1
18.26	1 +	09.94	1	59.34	1	35.81	2
18.80	2 +	11.41	1	60.45	2	35.95	2
19.70	2	12.20	1 +	61.89	1	36.31	4
26.67	1	12.83	1 +	62.40	2	39.49	1
27.35	1	13.15	1 +	62.87	1	41.25	1
29.31	2	13.84	1	65.69	1	41.59	3
33.39	2	14.30	1 +	67.70	2 +	45.75	3
35.25	1	14.62	1	68.21	3	47.15	1
37.38	1	15.30	1	70.40	1 +	47.57	2
37.82	2	16.30	1	74.75	1	47.89	1
38.21	2	16.61	2	75.10	1	48.33	1
38.61	1	18.2	2 + br	76.56	2	51.00	1
38.87	1	21.33	1	78.50	1	53.50	3
39.04	1	23.38	1	79.32	2	53.90	2
39.28	1	24.20	1	79.50	1	55.41	1
41.06	2	24.50	1	79.99	1	55.75	2
44.82	1	26.73	2	82.21	1	58.22	1
45.62	3	27.37	1 + br	82.82	2	60.56	1
47.40	2	28.50	1	84.40	1	63.85	1
51.70	1	29.21	2	84.80	1	64.99	1
51.98	2	30.75	2	85.46	2	65.37	2
53.40	1	33.03	2	86.65	2	65.73	1
55.05	2 + br	33.75	3 + br	88.82	2	67.15	1
56.25	1	34.85	2 +	90.93	1	67.84	1
57.95	2	35.05	2 +	91.55	2	68.88	1 +
59.83	1	36.48	1	93.17	1	69.72	1
60.10	2	37.09	1	93.98	1	70.55	1
62.95	1	37.35	1	94.45	1	70.65	1
66.73	1	39.90	2	3402.53	1	71.65	1
67.16	1	41.55	2	03.45	2	72.92	1
70.22	1	42.70	2	03.76	1	73.02	1
70.81	1	43.39	2 d?	07.40	1 +	73.76	1
72.05	1	44.61	1	08.18	2 +	74.53	1
75.87	1	45.24	1	08.90	3	75.00	1
77.95	1	45.46	1	09.50	1 +	75.26	1
84.95	1	46.13	3 r	11.18	1 +	77.31	1
86.43	1	46.85	3	21.35	3	78.91	1
87.8	1 + br	47.56	1	21.86	1	79.25	1
93.91	1	47.91	2	22.88	3	79.45	1 +
95.52	1	49.13	2	26.13	1	80.45	1

3481.46	2	3602.70	1	3686.95	2	3793.44	2
81.71	2	03.89	2	87.42	2	94.00	2
83.66	1	05.49	30 u	87.66	2	94.75	1
84.31	1	08.55	1	88.23	1	97.29	2
86.63	1	09.65	2	88.57	2	97.85	2
88.56	1	10.20	2	89.41	1	3800.7	1 + br
95.11	1	12.73	1	89.77	1	01.4	1 + br
95.52	1	13.30	1	96.01	1	02.4	1 + br
3501.60	1 +	13.80	1	3705.12	1 +	03.2	1 + br
01.90	1 +	15.77	2	10.25	2	04.95	5
02.45	1	19.57	2	10.75	1	06.97	2
08.25	1	26.90	1	13.10	1	08.06	1
09.00	1	29.56	1	14.52	1	10.4	1 + br
10.5	1 + Ni?	32.98	3	15.33	1	12.36	2 +
10.68	1	35.15	1	16.19	1 +	14.71	3
11.96	1	36.40	1	16.68	1	15.60	2
17.33	1	36.70	4	18.38	1	17.96	2
18.53	1	39.97	5	26.12	1	18.62	2
19.6	1 + br	40.55	2 (Fe)	30.96	3	19.72	1
19.8	1 + br	41.61	2	32.19	3	20.14	1
23.75	1	41.99	3	43.10	2	21.00	1
27.22	1 +	45.73	1	43.71	3	22.25	1
31.23	1	46.30	1	44.03	4	23.68	1
37.38	1	48.66	2	44.67	2	25.51	2
48.1	1 + br	49.11	3	47.42	1	26.58	2
49.15	2 + br	50.00	1	48.75	2	30.20	3
50.81	3	52.75	1	49.15	3	31.20	2
53.0	2 + br	54.07	3	51.34	1 +	32.50	1
55.90	1	56.40	3	55.99	1	34.94	2
56.27	1	60.15	1	57.30	2 +	36.22	2
58.66	3 +	61.42	1	57.80	3	41.43	2
59.95	1	62.56	1	58.18	2	42.22	1 +
62.41	1	63.01	2	64.76	1	44.40	1
62.63	1	63.36	2	67.60	1 +	47.6	1 + br
63.06	1	65.64	1	68.37	5	47.9	1 + br
64.42	1	66.14	1	68.86	2	49.10	2
64.87	1	66.32	1 +	69.14	1	49.45	2
66.28	3 +	66.78	2	78.06	1	49.60	2
72.90	2	68.17	1	80.22	1 +	52.33	2
73.80	1	72.10	1	80.90	1	53.30	2
74.19	1	76.45	2	83.75	1 +	54.36	3
75.00	2 + u?	77.79	1	86.38	1	54.95	1 +
78.81	30 u	77.98	1	87.29	2	55.41	2
82.80	1	79.18	1	89.87	1 +	55.73	2
84.47	1 + br	79.97	2	90.35	1	56.41	1
87.12	2	81.82	1	90.62	2	57.75	3
93.64	30 u	85.12	1	91.52	2	59.0	2 + br
99.54	1	85.40	1	92.29	2	62.69	1
3601.81	3	85.70	2	92.55	1	68.40	1

3870·4	2 + br	3962·35	1	4034·12	1	4095·13	1
74·70	2 + br	63·85	10	35·30	1	98·0	2 + br
75·3	2 + br	69·22	2	37·42	2	99·19	2
77·50	1	69·90	3	37·77	1	99·60	1
79·39	3	70·20	1	39·20	2	4100·00	1
80·56	1	71·41	3	39·42	1	01·33	2
81·41	3	72·83	2	41·97	1	04·01	1
82·05	1	76·44	1	42·40	2	05·00	2
85·36	4	76·85	8	43·86	2	06·22	1
86·92	2	78·80	3	44·35	1	08·56	1
91·00	2	79·41	2	46·93	1	09·73	2
92·06	2	79·95	3	48·91	2 (Mn)	11·1	2 + br
94·20	3	81·41	3	49·20	1	19·60	1 +
94·76	1	83·40	2	49·95	1	19·88	1 +
97·79	1	84·08	4	50·20	1	20·78	2
3902·24	2	84·50	3	51·49	2	21·45	2
03·05	3	88·02	1	55·5	1 + br	21·70	1
03·29	2	88·80	1	55·75	1 + br	21·98	2
07·91	1	90·14	2	56·19	2	22·35	2
08·91	8	91·30	4	56·95	2	23·54	2
12·15	5 +	91·82	3	57·39	1	25·67	1 +
14·48	1	92·29	1	57·97	1	26·69	2
15·68	1	92·99	3	58·94	3	27·10	1
15·98	2	94·13	2	60·82	2	27·46	1
16·41	2	96·45	1	64·32	1	28·56	1
17·19	2	99·04	1	65·88	2	29·4	2 + br
17·80	2	99·83	2	67·09	3	31·55	2
19·32	8	4000·12	1	67·98	1	34·55	2
20·25	1	00·78	1	68·60	1	37·57	1
21·21	5	01·61	3	68·84	1	38·13	1
26·82	2	04·08	2	71·20	2	39·3	1 + br
28·82	4	12·61	3	72·97	1	42·39	1
29·85	1 +	14·81	2	75·00	2	42·65	1
38·54	2 +	15·98	1	76·20	2	46·38	1
39·50	1	18·35	2	77·25	2	46·65	1
41·67	4	21·59	1	77·85	2	46·86	1
43·78	1	22·40	2	81·90	1	48·65	1
45·64	2	23·60	1	82·08	1	51·85	1
46·10	2	23·90	2	85·20	1	52·93	2
49·00	1	24·73	1	86·14	1	53·23	2
49·71	1	25·18	3	86·27	1	54·00	3
51·26	2	25·63	1	87·10	1	61·55	3
51·93	2	26·31	3	88·93	1	62·67	1 +
52·55	2	27·23	3	89·80	1	63·79	3
53·30	2	28·21	1	90·2	1 + br	64·43	1
56·54	1	28·64	1	90·50	2	65·70	3
56·82	1	31·28	1	92·35	2	70·00	3
58·22	1	33·16	2	93·25	1	70·40	2
60·91	2	33·44	2	93·50	1 +	71·86	2

2	4231.55	1	4305.61	2	4375.49	3
1	31.82	1	07.67	1+	76.95	2
1	32.41	2	09.89	1	77.69	2
4	33.05	2+	10.60	1+	79.95	1
1	34.70	2	12.65	1	81.30	2
2	37.90	2	12.95	1	83.05	1
1	39.12	3	14.16	1	85.15	8
2+	40.89	2	18.10	1	87.64	3
4	41.36	1	19.52	1+	91.93	3
1	42.55	1	19.80	2	92.50	1
1+	43.01	1	20.78	2	93.74	1
2+	48.45	1	21.44	1	95.61	1
1	48.87	1	21.81	1	97.44	2
2	52.39	1	23.70	2	4400.01	2
1	54.51	50 u	25.25	3	03.62	3
2	55.70	1	32.75	2	06.46	1
2	56.80	1+	37.74	10	06.87	1
1	57.54	1	38.56	1	09.76	1
3	59.32	1	38.95	1	10.49	2
1	60.40	1+	39.62	4	11.35	3
2	61.51	2	39.90	3	12.44	2
1	61.80	1	40.31	2	13.21	1
2	62.30	1	41.36	1	14.02	2
1	62.56	1	41.60	1	14.55	1
1	63.30	3	42.17	1	19.30	1
2	67.01	1	43.33	2	21.19	1
2	68.95	1	43.89	1	22.8	2+br,d
2	70.15	1	44.68	10	23.55	1
2	73.10	1	45.27	1	24.49	3
2	75.00	50 u	45.95	1	25.31	1
1	76.13	1	46.99	3	26.87	1
2	78.00	1+	47.64	1	27.90	1
1	80.57	3	49.00	1+	28.66	2
2	84.90	1	51.22	5	30.09	1
2	85.10	1	51.98	10	30.72	2+
3	88.58	1	54.13	2	32.35	2
2	89.90	50 u	55.5	1+	33.00	1
1	92.14	2	56.50	1	34.15	1
2	93.71	2	56.95	2	43.89	1
2	95.91	3	57.69	2	50.5	1+br
2	96.46	1	59.82	8	53.50	1
2	96.80	1	63.31	3	55.62	1
3	97.21	2	64.3	1+	56.77	1
2	97.89	3	65.03	1+	58.72	3
2	99.85	2	68.45	1	59.57	1
1	4300.13	1	71.48	10	59.92	2
2	00.66	2	73.42	3	60.90	1+
2	01.35	2	73.81	1	61.50	1
1	02.95	1	74.32	3	62.91	2

4464.85	2	4526.66	5	4581.27	1	4628.69	1	
65.09	1	27.58	4	82.25	1	30.66	1	
65.53	2	30.02	2	82.65	1	32.39	2	
66.35	1	30.91	5	84.12	1	33.49	2	
67.74	2	32.95	1	84.30	2	34.30	1	
68.55	1	35.33	3	85.25	2	34.80	1	
68.84	1	35.89	8	86.31	2	35.63	1	
69.99	1	39.94	3	88.06	1	37.36	2	
70.67	1	40.64	3	88.40	1	37.95	2	
73.96	2	40.88	3	89.22	1	39.78	3	
75.50	3	41.23	3	90.78	1+	40.79	1	
77.20	1+	41.65	3	90.90	1+	41.9	1+	br
77.66	1	42.76	2	91.61	8	42.21	1	
78.14	1	43.89	2	92.30	1	42.60	1	
79.05	1	44.78	4	94.01	1+	44.11	1	
80.45	2	45.47	2	94.63	1	46.35	20	
81.64	1	46.10	5	95.2	1+	46.99	2	
83.02	3	46.77	1	95.79	3	48.29	2	
84.55	1	48.85	1	96.61	1	49.01	2	
88.21	2	50.65	1+	97.15	1	49.61	3	
89.62	2	53.10	1	98.64	2	51.49	8	
90.8	1+	54.17	2	99.21	1	52.38	10	
92.00	3	55.01	2	4600.30	3	53.00	1	
92.50	3	55.30	2	00.90	5	54.3	1+	br
95.50	1	55.51	1	01.21	3	54.94	2	
97.03	10	56.35	3	02.80	1	56.38	2	
98.87	3	58.47	1	04.75	1+	57.02	1	
99.46	1	58.86	2	05.90	1+	61.47	1	
4500.42	3	61.71	1	06.57	1	62.10	1+	
01.25	3	63.48	2	10.09	1	62.65	1	
01.90	2	63.67	1	11.26	1	63.53	3	
02.43	1	63.89	2	12.15	2	64.05	3	
03.25	1	64.36	2	13.53	8	65.00	5	
04.13	1	65.70	4	14.30	1	66.10	2	
06.99	2	66.40	1	14.70	1	66.40	1	
08.20	1+	66.79	1	14.93	1	66.72	2	
08.95	1	69.80	4	16.28	10	67.34	1	
10.22	1	70.52	1	19.00	1	69.52	3	
12.10	4	70.75	1	19.70	4	69.90	1	
12.80	1+	71.28	2	21.25	1	70.30	1	
13.45	1	71.89	4	22.10	3	73.37	1	
14.70	8	74.43	1	22.62	2	75.3	1+	br
15.60	2	74.68	1	22.95	2	76.5	1+	br
18.83	1	75.30	2	24.75	2	77.80	1+	
20.00	1	76.99	1	25.54	1	80.70	2	
21.32	2	78.50	1	26.35	10	81.10	2	
22.25	1	78.8	1+	27.03	1	84.80	1	
25.00	1	79.80	1+	27.54	1	86.40	1	
26.28	2	80.26	8	27.86	1	89.55	3	

4690·35	1 +	4761·97	1	4851·70	1	5139·81	2
93·20	1	64·48	3	55·38	1	44·85	1
94·15	2	64·87	1	57·55	1	61·94	1
94·96	1	66·88	2	61·40	2	66·41	2
95·35	2	67·47	2	62·01	3	77·57	1
97·25	2	68·02	2	64·55	1	84·73	2
97·60	1	68·80	1	70·99	3	92·18	2
98·71	4	70·0	1 + br	74·82	1	93·67	1
99·17	1	70·90	1	75·70	1	96·61	2
99·80	2	71·79	1	76·60	1	5200·37	1
4700·80	2	74·76	1	80·21	1	04·71	20
01·76	1	75·32	1	85·13	1	06·24	30 u
02·13	1	75·73	1	86·01	3 d	08·60	30 u
05·60	1	77·81	1	87·20	3	12·40	1 +
06·29	2	80·11	1	87·88	1	14·27	2
08·20	10	83·25	1 + br	88·71	2	21·10	1
14·20	1	87·95	1	94·57	1	21·93	2
17·78	1	89·53	5	98·67	1	22·85	1 +
17·90	1	90·55	2	4903·47	3 (Fe)	24·24	1 +
18·63	10	92·72	4	05·24	1	24·70	1 +
21·35	1 +	94·70	1	19·64	1	25·19	4
22·90	1	96·33	2 +	21·15	1	26·00	1
23·31	2	97·1	1 + br	22·49	4	27·09	1
24·10	1	97·91	1	23·50	1	28·25	1
24·60	3	98·77	1	30·36	1	30·35	1
25·91	1	99·43	1 +	31·30	1 +	39·12	1
26·13	1	4801·24	5	36·50	3	40·62	1 +
27·32	3	04·88	1	42·68	3	43·53	1
29·92	3	05·47	1 +	44·75	1	47·72	8
30·90	4	06·48	1	49·77	1 +	55·21	5 d
36·35	1	09·52	1	53·90	1	61·91	1
37·52	6	10·95	1	54·99	3	64·35	8
41·31	1	14·50	1	65·10	2	65·33	1
43·33	1	16·35	1	86·14	1	65·90	3
45·49	2	24·16	1	5004·55	1 + br	72·18	2
47·26	1	24·40	1	13·49	2	73·59	1
47·87	1 +	25·71	1	18·80	1	75·33	3
51·32	1 +	29·53	5	22·04	1	76·06	5 + d
52·29	3	31·86	1	48·95	1	78·39	1
53·10	1	35·90	1 +	52·08	1	80·48	1
54·92	2	36·55	1 +	66·06	1	87·34	1
55·33	2	37·06	2	67·87	2	93·03	1 +
56·30	8	38·63	1	68·45	1 +	93·55	1 +
57·07	1	40·60	1 +	73·10	1	96·86	4
57·53	1	41·97	1 +	92·03	1	97·48	2 + br
57·80	1	43·30	1 +	5110·93	1	98·46	4 +
60·10	1	46·52	2 +	13·30	1	5300·89	4
61·05	1	47·41	1	22·27	1	04·33	2
61·45	1	48·46	1	23·63	1	13·02	2

5318.92	2	5554.50	1 +	5784.17	8 +	6135.99	2 +
28.53	10 +	68.51	1	85.29	6 +	62.48	15 (Ca)
29.33	3 +	74.63	1	86.08	5 + d?	6261.50	1
29.95	3 +	5628.82	3	87.25	2	6313.42	1
40.65	2	38.37	1	88.22	10	15.99	1
45.00	1	42.59	2	88.59	2	22.75	1
45.99	20	48.40	1 +	91.30	15	27.61	1
48.50	10	49.52	2	92.00	1	30.30	4
68.72	1	58.82	1	96.98	2	42.95	1
70.54	1	64.24	3	98.10	1	63.03	4
71.67	2	74.44	1	98.68	1	6501.43	1
73.90	1	81.42	2 +	5801.43	1	29.36	2 +
87.14	2	82.63	2 +	38.88	2	38.12	2
87.73	2	94.94	3	43.46	1	73.10	2
90.60	1	98.53	4	44.84	2	81.19	1
91.56	1	5700.75	1	76.77	1	94.91	1
5400.75	3 (Fe)	02.52	3	84.67	2	97.80	1 +
05.19	1	12.87	1	88.20	1	6630.25	2
10.01	20	12.98	3	89.02	1	43.27	1
42.60	1	20.03	1	90.23	1	61.30	3
64.12	2	29.41	1	5902.35	1	69.50	1 +
80.71	2	38.75	1	59.42	1	6881.7	1 + br
5508.40	1	46.64	1	64.15	1 +	82.4	1 + br
10.15	1	53.89	2	70.91	1	83.2	1 - br
12.5	1 + br	72.89	1	6029.50	1	6924.4	1 + br
19.77	1 +	81.42	3 +	45.63	1	25.4	1 + br
41.0	1 + br	82.10	3 +	47.88	1	78.75	1 +
48.81	1	83.38	5 +				

Kanten.

5794.7	K. R.	6052.0	K. R.	6063.1	K. R.	6394.7	K. R.
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XIX. Cs. Caesium.

Ältere Messungen: H. Kayser und C. Runge, Berl. Akad. (1890.)

H. Lehmann, Ann. d. Phys. 5 (1901) (Ultra Rot). J. M. Eder und E. Valenta, Wiener Akad. 119 IIa (1910) (Rot).

Material: Caesiumchlorid von E. Merck.

Verunreinigungen: Ba, Ca, Li, Rb, Sr.

Linienzahl: 14.

3612	1 + br	3889.2	1 + br	4593.39	50 u ¹⁾	5845	1 + br
3876.8	1 + br	4555.50	200 u ¹⁾	5664.4	1 + br	6010.5	2 +

¹⁾ Rote Komponente stärker.

0	10 +	6355·3	2 + br	6723·6	50 + u ¹⁾	6974·5	5 + u
3	1 + br	6587·3	3 + r, br				

XX. Cu. Kupfer.

Messungen: H. Kayser und C. Runge, Berl. Akad. (1892).

M. Eder und E. Valenta, Wiener Akad. 119 II a (1910) (Rot).

al: Käufliches Metall.

Einzigungen: Ag, Bi, Ni, Pb, Sn, Zn.

zahl: 368.

8	1	2630·10	2 +	2858·40	3	3025·11	3
0	1	35·50	2 +	58·86	3	30·38	2
5	1	45·41	1 +	66·30	1	36·22	10
0	2 u	49·90	1 +	74·70	1 +	37·21	1
5	1	51·80	1 +	75·80	1 +	39·20	1
3	2 u	71·30	1 +	83·10	8	39·60	1 +
8	2 u	72·15	1 + br	85·93	1	44·17	2
9	1	76·55	1 +	91·00	2 +	52·64	1 +
	1 +	2701·10	1	91·80	2 +	53·51	1 +
1	2 u	02·70	1 + br	2911·35	1 +	63·54	10
4	1	03·30	1	22·98	1 +	69·01	1
6	2 u	13·61	1	23·38	1 +	70·90	1 + br
1	1	15·60	2 +	23·83	2 +	72·20	1
5	1 +	20·28	1 +	25·00	1 +	73·94	8
8	2 u ²⁾	24·03	2 +	25·55	1 +	78·93	1
0	1	45·53	1 +	38·99	1	80·32	1
3	3 u	51·35	2 +	51·36	2 +	88·22	4
7	2 +	51·9	1 + br	61·31	20	94·12	10
0	1	63·89	2 +	74·83	1	3100·05	10
9	1 +	66·51	50	78·41	3 +	08·70	20
7	2	68·94	2 +	79·52	3 +	13·59	2 Co?
2	5 +	69·35	1 +	82·28	1	16·44	15
8	1	82·73	2 +	82·93	1 +	18·45	1
0	3	83·67	2 +	86·05	1 +	20·58	3
5	2	86·62	1 +	91·90	1 +	26·25	15
4	5 u	92·05	1 +	97·50	10	28·80	10
0	1	2802·77	1 +	98·50	2	31·45	1 +
5	1 + br	03·75	1 +	3010·99	10	37·9	1 + br
0	1 + br	05·80	1 +	13·94	1	40·44	8
6	50 u ²⁾	24·50	20	14·97	2 +	42·55	10
1	1 + br	37·73	1	21·72	5	46·95	10
9	2 +	46·60	1	22·72	4	49·63	2

violette Komponente stärker.

rote Komponente stärker.

3151·78	1 +	3396·49	2	3620·50	3	3933·15	1 +
56·73	3	3402·39	6	21·38	10	47·03	1
60·18	2	04·80	4 +	24·35	5 r	64·30	1 +
69·80	8	13·47	2 +	27·46	8 +	65·8	1 + br
76·0	2 + br	15·90	3 +	29·91	2	4003·18	2
78·34	1	20·28	1	32·70	2	11·00	1 +
94·22	10	22·3	2 + br	36·05	3	15·8	1 + br, v
3208·30	8	34·12	1 +	41·85	3	22·88	100
11·52	2	36·15	1	45·37	3	50·79	2
23·56	3	37·93	1	48·54	2	56·6	2 + br u, v
24·80	3	50·47	10	51·01	1	62·91	100
26·69	3	54·89	8 +	52·5	2 + br	63·60	10 +
31·29	5	57·97	6	54·5	2 + br	73·42	1 +
34·04	1 +	59·53	2	56·00	2	75·75	2
35·84	5	63·7	1 + br	56·90	1	80·70	2
43·28	8	65·55	2 +	59·49	2	4104·37	3
47·68	1000 u	72·27	3	65·87	2	23·40	2 +
66·16	3	74·70	1	72·09	2	77·84	10
68·38	3	76·12	8	76·97	2 + br	4231·2	1 + br
74·09	1000 u	82·0	1 + br	84·75	2	42·40	2 +
77·45	2	83·90	8	85	1 + br	49·12	8
79·94	8	87·68	2	87·7	2 + br	53·50	1 + br
82·83	5	88·93	2	99·24	1	59·57	2 + br
90·67	20	92·09	1	3700·69	6	67·4	1 + br
92·50	2	98·19	3	12·12	2	75·29	20
93·08	4	3500·42	2	20·90	2	4328·9	1 + br
3308·09	20	01·46	1	21·83	1	36·2	1 + br
17·34	6	01·67	1	34·35	3	54·8	1 + br
19·81	5	07·53	1	41·39	4	78·30	20 +
29·76	4	10·46	1	59·61	2	97·2	1 + br
35·37	4	12·26	8	64·97	1 +	4415·7	2 + br
37·95	10	17·16	2	72·02	3	80·60	10
41·30	1	20·15	4	80·20	1	4507·6	2 + br
49·40	6	24·36	6	3800·02	1	09·57	8
51·37	1	27·61	6	00·61	2	13·40	1 +
54·61	5	30·54	10	03·6	1 + br	31·00	15
58·45	1 +	31·06	1	05·40	3	39·9	3 + br
58·90	1 +	33·89	10	12·07	1 +	87·17	20 +
62·10	1 +	45·08	3	13·65	2	4642·8	1 + br
65·51	10	46·56	2	17·65	1	51·39	20
75·81	2	66·28	1 +	21·03	2	74·95	4 +
79·83	1 +	94·17	2	25·20	2 +	97·65	2 + br
80·03	1 +	98·18	2 +	60·61	3	4704·82	8
81·28	3 +	99·28	10	61·85	3 +	67·5	1 + br
81·57	4	3602·19	10	62·90	1 +	76·4	1 + br
84·96	2 +	09·43	2	81·86	1	94·3	1 + br
88·2	1 + br	10·93	3	99·3	1 + br	97·25	1
92·17	1	13·89	5	3921·40	2	4843·55	1
95·61	2	14·35	3	25·40	2	59·12	2

4866·4	1 + br	5105·80	50	5292·63	8 r	5700·45	30
83·44	1	12·13	1	5322·66	1	32·52	1
4966 64	1	43·33	1	52·90	1	82·32	50
66·90	1	44·3	1 + br	55·2	1 + br	6223·87	1 +
76·38	1	53·45	100	60·23	1 +	68·42	1 +
84·32	2	88·96	1	91·84	2 + br	6325·6	1 + br
91·58	1	5201·1	1 + br	5408·5	1 + br	6474·47	1 +
5016·81	2	18·40	200	32·3	2 + br	85·40	1 +
34·5	1 + br	20·22	20	5536·0	2 + br	6621·87	1 +
76·4	1 + br	50·7	1 + br	55·13	2	6741·8	1 +
93·26	2	60·2	1 +	5631·87	1		

XXI. Dy. Dysprosium.

Ältere Messungen: G. Eberhard, Publ. des Astr. Obs. Potsdam 20 (1909). J. M. Eder und E. Valenta, Wiener Ber. 119, IIa (1910) (Rot).

Material: Dysprosiumnitrat von C. Auer v. Welsbach.

Verunreinigungen: Nh?

Linienzahl: 3312.

2357·00	1	2668·16	1	2779·67	1	2815·34	2
92·25	1	70·36	1	82·72	1	16·50	3
2410·11	1	76·94	1	82·83	1	17·83	1 +
22·84	1	77·44	1	85·67	1	19·80	1
39·90	1	79·98	1 +	85·83	1	20·15	1
41·74	1 +	89·36	1	86·14	1	22·94	1
60·05	1	92·12	1	86·33	1	24·65	1
81·02	1	92·93	1	91·55	1	25·57	2
92·25	1	2709·10	1 +	96·64	1 +	25·94	1
2513·65	1	27·26	1	98·92	1	26·89	1 +
43·95	1	29·59	1	99·10	1	27·22	1
52·40	1 +	39·43	1 +	2800·45	2	27·45	1
58·03	1	40·80	1	00·65	2	27·73	1
60·30	1	52·16	1	01·50	1	28·48	1
66·35	1	52·27	1	03·35	1	29·48	1
85·41	1	57·19	1	03·97	1	32·20	1
92·14	1	65·33	1	08·74	1 +	34·00	1 +
2600·25	1	66·50	1	09·82	1 +	34·91	1
00·86	1	66·59	1	10·29	1 +	35·27	1
08·80	1	71·30	1	10·67	1 +	35·37	1
18·46	1	72·50	1	10·95	2	35·85	1
23·77	1	72·70	1	11·20	1	36·24	1 +
34·89	2	73·93	1	11·54	2	37·10	2
39·88	1 +	74·35	1	12·28	1 +	37·48	1 +
42·26	1	74·63	1	12·91	1 +	37·70	2
45·45	1	75·64	1	14·70	1 +	38·46	1 +

2839.30	1	2884.40	2	2917.37	1	2950.44	3
39.94	1	84.94	2	18.00	1	51.00	1+
41.10	1+	85.17	1	18.41	1	52.25	2
42.14	1	85.62	2	18.74	2	52.70	1+
43.00	1	86.35	1	19.49	1+	53.16	2
45.24	1	87.20	1+	20.01	1+	53.83	2
46.48	1+	88.04	1	20.45	1	54.40	1+
47.70	1	88.35	1+	21.08	1	55.10	1+
47.99	1	88.65	1+	22.21	1	55.65	1+d
48.47	1	88.90	1+	23.24	1	56.10	1
49.06	1	90.57	2	24.45	1	56.26	1
55.55	1+	90.87	2	25.23	1	56.95	1
56.30	1	91.15	2	26.10	1	57.24	1
56.55	2	91.90	1+	27.15	2	57.87	2
57.23	2	92.21	1	27.39	1+	58.18	1
57.60	1	92.68	1	28.05	1+	58.50	1
59.40	1+	93.46	1	28.37	1+	58.72	1+
59.87	2	94.99	1	30.95	1+	59.51	1
60.30	2	95.09	1+	31.10	2	60.50	1
60.81	2	95.46	1	31.51	1+	60.97	1
62.84	2	95.83	1+	32.00	1	61.24	1
64.17	1+	96.30	1+	32.16	1	61.70	2
65.44	1	98.07	1+	32.53	1	62.00	1
66.39	2	98.40	1	32.84	1	62.47	2
67.10	1+	99.02	1+	33.45	1	63.00	1
67.75	2	99.14	1+	34.42	2	63.50	1
68.85	1	2900.10	1+	34.61	3	63.60	1
69.95	1	00.96	2	35.35	1	64.14	1
71.90	1	02.70	1+	35.50	1+	64.72	2
72.56	1	03.01	1	35.87	1	64.85	2
73.39	1	04.13	1	37.45	1+	66.18	1
75.30	2	04.25	1+	38.42	1	66.71	1
75.95	1	04.80	2	38.60	1+	67.44	1
76.29	1	05.27	1	40.15	1	67.60	1
76.52	2	05.98	1	41.15	2	67.74	1
77.05	1+	06.51	3	41.55	1+	69.00	1
78.00	2	07.58	1	42.12	1	69.45	2
78.57	1	07.89	1	42.74	1	71.30	1+
78.85	2	09.47	2	43.57	1	72.54	1
79.25	1+	09.83	1	43.80	1+	72.77	1
80.15	1	10.00	1	44.20	1	73.31	3
80.60	1	10.20	1	44.69	3	73.76	1
80.85	1	10.75	1	46.41	2	74.50	1
81.20	2	11.50	1	46.86	2	74.79	1
82.15	1	11.90	1+	47.16	2	75.35	1
82.74	1+	12.82	1+	47.29	2	75.69	2
83.40	1+	13.84	1+	48.41	3	75.97	2
83.80	1+	14.05	3	49.23	1+	76.24	1
84.09	1+	16.41	1	50.20	1	77.08	1

4	2	3003.15	1	3029.39	1	3053.77	1
0	1	03.56	1	29.95	3	53.83	1
2	1	03.87	2	30.23	1 +	54.15	1 +
2	1 +	04.30	1	30.52	2	54.47	1 +
0	1	05.65	1 +	30.95	1	54.79	1
6	2	06.06	1	31.31	2	55.97	1
0	1	06.35	1	32.65	1	56.44	1 +
6	1	06.55	1 +	32.95	1	57.08	2
9	1	07.15	1	33.30	3	57.25	1
1	1	07.65	1	34.60	2	57.55	1
1	1	07.85	1	34.83	1	58.89	1
3	1	08.25	2	35.20	1 +	59.59	1
3	1	08.93	2	36.81	3	60.10	2
5	1	09.33	1	37.16	1	60.40	1
3	1	10.13	1	37.50	2	60.77	3 d
0	1	10.59	1	37.90	1 +	61.48	2
2	3	10.88	1	38.40	4	61.60	1
1	1	11.27	1	39.25	1 +	62.29	2
6	1	12.41	2	39.55	1	62.70	3
0	2	12.73	1	39.90	1	63.33	1
1 +	2	13.49	1	40.39	2	63.56	1
2	2	13.60	1	41.38	1 +	63.90	1
1	1	13.81	1	41.77	2	64.15	1
1	1	14.16	1	42.20	1	64.35	1
2	2	14.40	1	42.35	1	64.67	1
1	1	14.77	1	42.60	1	65.26	2
2 d?	2	15.19	2	42.76	1 +	65.73	1
2	2	15.80	3	43.28	3	66.45	1 +
1 +	2	16.13	1	43.59	4	67.10	3
2	2	16.43	1	45.51	1 +	67.55	1
2	2	16.71	1	45.87	1	69.03	2
1	1	17.10	3	46.10	1	69.45	1
1	1	17.52	1	46.48	2	69.80	2
1	1	18.34	1	46.86	1	70.55	2
1	1	19.75	1	47.01	1	71.05	1 +
2	2	20.18	1	47.40	1 +	72.01	3
1	1	21.89	2	47.70	3	72.50	1
2	2	22.19	1	48.35	1	72.86	1
1	1	22.70	1	48.50	1	73.05	2
1	1	23.15	1	49.23	3	73.64	3
1	1	24.80	1 + br	49.74	1	74.11	2
1	1	25.55	1 +	50.15	1	74.55	1 +
1	1	25.74	2 Fe?	50.53	1	75.19	1
1	1	25.97	1 Fe?	50.72	1 +	75.31	1
1	2	26.30	3	51.37	1 +	75.60	1
2	1	27.46	1	51.59	2	76.00	1
1	1	27.70	2	52.40	2	76.48	1
2	1	28.60	1	52.83	1	77.00	2
1	1	29.03	1	53.28	1	78.44	2

3078.80	3	3107.05	2	3128.83	1	3149.36
79.42	2	07.40	1 +	29.38	2	49.60
80.13	1	08.50	1 +	29.85	1	49.98
80.40	1	08.95	1 +	30.25	2	50.27
81.01	2	09.36	1	30.63	1	50.57
82.62	2	09.62	1	30.87	1	50.75
83.14	1	09.88	3	31.30	1	51.35
83.55	1 +	10.40	1	31.62	1	51.63
84.56	1	10.82	2	31.94	1	51.99
84.77	1	11.30	1 +	32.21	2	52.33
85.16	1	11.64	1	32.70	2	52.46
85.69	1.	11.90	1	33.10	2	53.42
85.88	1	12.20	1	33.61	1 +	53.86
86.49	1	12.98	2	33.91	1	54.16
86.72	1	13.20	2	34.20	1	54.41
87.61	2	13.54	1	34.40	1 +	54.67
88.55	2	14.0	1 + br	34.60	1 +	54.77
89.00	1 +	14.45	1 +	35.49	4	55.49
89.55	1 +	14.88	1 +	35.79	1	56.63
89.74	1	15.99	2 +	35.90	1	57.30
89.87	1	16.50	1 +	36.10	1	57.65
90.30	2	16.96	2	36.55	1 +	58.05
90.65	1	17.59	3	36.79	2	58.30
90.96	1	18.06	2	37.21	1	58.56
92.01	1	18.23	1 +	37.65	1 +	58.96
93.21	2	18.50	1	38.00	1	59.40
93.56	1	18.73	1	38.25	1	59.80
93.91	2	19.05	1	39.10	1	60.11
94.63	1	19.55	1	39.60	2	60.63
95.14	2	19.90	1	40.02	1	61.13
95.81	3	20.28	3	40.15	1	61.48
96.40	1	20.60	1	40.52	1	61.89
97.00	2	20.86	1	40.78	3	62.65
97.39	1	21.25	1	41.21	4	62.93
97.71	1	21.50	1	42.04	1	64.20
98.15	2	21.65	1 +	42.41	2	64.73
98.65	2	22.07	1	42.72	1	65.02
99.00	1	22.25	1	43.00	1	65.28
3101.01	1	22.55	1	43.29	2	65.54
01.47	1	23.09	2 d	43.92	3	65.77
02.01	3	23.50	1	44.35	1	65.91
02.30	2	23.71	1	44.65	1	66.42
02.88	1	25.00	1	45.30	3	66.95
03.34	3	25.36	1	46.25	3	67.55
03.91	3	26.26	3	46.63	1	67.94
04.20	2	26.87	2	47.03	2	68.24
05.09	3	27.57	1	47.61	3	68.70
06.15	1 +	27.70	1	48.26	1 +	69.05
06.73	1	28.50	3	49.19	1	69.23

3169.67	1	3191.72	1	3219.66	2	3245.78	1 +
70.11	4	92.35	1	20.57	2	46.00	1
70.86	2	93.11	2	21.62	3	46.30	1
71.07	2	93.40	3	21.75	2	46.82	1
71.66	2	93.79	1	22.00	1	47.05	1 +
72.20	1	93.98	1	22.96	1	48.48	3
72.54	1	94.52	1 +	23.40	3	49.03	1
72.77	1	94.92	1	23.95	2 +	49.54	2 +
73.15	1	95.60	1 +	24.20	1	50.08	1 +
73.98	1 +	96.05	2	25.21	3	50.67	1 +
74.14	1.	96.54	2	25.49	1 +	51.15	2
74.45	1 +	97.10	1 +	26.10	4 d?	51.43	8
75.00	3	97.69	1	26.50	2	52.01	3
76.20	1 +	98.30	1 +	27.18	1 +	52.34	3
76.46	1	98.89	1	27.55	1	52.76	1
76.83	1	99.34	2	27.84	2	53.10	1 +
77.33	1	3200.01	1 Ti?	28.27	1 +	53.35	1 +
77.64	2	01.00	1	28.68	1 +	54.05	2
78.00	4	01.40	2	29.10	3	54.64	2
78.48	3	01.74	2	29.46	3	55.37	1
79.13	2 +	02.34	2	30.05	3	55.82	1
79.45	2	02.65	2	30.43	2	56.42	4
80.83	1	02.95	1	31.45	1	57.37	2
81.20	1	03.96	1	31.80	1	57.51	2
81.38	1	04.45	2	32.25	2	58.15	1
81.71	1	05.06	1	32.75	3	58.44	1
82.05	2	05.59	2	33.53	2 +	58.80	1
82.57	1	06.51	3	34.20	2 +	59.04	1
82.80	1	06.85	2	34.62	2	59.47	1
83.28	2	07.21	3	35.20	2	60.12	3
83.67	1	07.46	1 +	36.00	8 r	60.84	3
84.04	1 +	08.46	1	36.76	4	61.13	1
84.34	2	08.93	3	37.20	2	61.37	2
84.64	1	09.38	2	38.31	2	61.75	1
84.86	3	09.84	1	38.83	2	62.15	2
85.55	1 +	10.11	1	39.18	1	62.40	2
86.06	1	10.41	1	39.70	1	63.10	2 +
86.48	3	12.12	2	40.14	2	63.30	2 +
87.33	1	12.53	1	40.50	1	63.72	1
87.78	3	12.78	2	40.92	3	64.02	1 +
88.48	1	13.26	2	41.42	1	64.45	2
88.78	2	13.80	1 + d	42.10	1	64.89	2
89.17	2 +	14.72	3	42.60	1	65.31	2
89.89	2	15.30	4	43.20	2 d?	65.70	2 d?
90.25	2	16.31	1	43.85	3	66.15	3
90.76	1	16.72	5	44.27	1	66.35	3
90.96	1	17.23	1 Ti?	44.45	1 +	66.76	1
91.34	1	17.66	1	44.89	1	67.91	2
91.61	1	18.90	1	45.22	4	68.24	1

3268.45	1	3292.79	1	3318.59	1	3345.00	1 - -
68.75	1	94.00	3	18.87	1 +	45.51	1
69.26	4	94.43	1	19.54	1	45.91	1
69.72	1	94.81	2	20.01	10	46.29	1
71.10	1	95.10	2	21.20	2	46.80	1
71.50	1 +	95.35	1	22.01	1	47.35	1 +
71.82	1	96.06	2	23.04	2 +	47.93	4
72.21	3	96.47	3	23.41	2	48.15	1
72.90	3	97.02	1	23.85	1 +	48.90	1
73.15	1	97.35	1	24.03	1 +	49.06	1
73.76	1	97.77	3	24.35	2 +	49.51	3
74.39	1	98.40	2	24.98	1 +	50.42	1
74.75	1 +	99.30	2	25.40	1 +	50.80	1
75.10	1	99.98	1	25.70	1 +	51.11	1
75.90	2	3301.04	2	26.31	3	51.90	1
76.05	2	01.65	1	26.60	2	52.34	1
76.35	1	01.85	1	27.19	2	52.82	3
76.88	1	02.20	2	27.45	2	53.36	1 +
77.21	1	02.62	3	28.90	2	53.72	4
77.74	2	03.31	1 +	29.60	1 + Ti?	54.30	1 +
78.00	1	03.77	2	30.00	1 +	54.80	1
78.45	2	04.17	1	30.34	1 +	55.20	2
79.03	1	04.45	2	30.70	2	55.75	1
79.61	2	04.86	2	31.35	3	56.35	2
79.83	3	05.61	8	32.18	2 + Mg?	56.60	1 - -
80.20	4	06.36	4	32.87	1	57.30	1 - -
80.79	1	06.91	1	33.18	1	57.45	1
81.77	3 +	07.60	1 +	33.66	1	57.76	1
82.18	1	08.00	1 +	34.21	3	58.08	1
82.62	1 +	08.20	1 +	34.55	2	58.41	3
82.93	4	09.00	10	34.90	1	58.75	3
83.20	1	09.56	1	34.99	1	59.10	1 +
83.80	2 + d	10.01	1	35.60	1 + d	59.61	3
84.15	1	11.10	2	35.99	2	60.28	1 +
84.50	3	11.41	1	37.27	1 + d	60.40	1 +
85.02	2 +	11.65	2	37.81	1 +	60.80	1
85.60	1	12.45	1	38.40	1	61.04	1
85.80	1	12.85	4	38.70	1	61.35	2
86.27	2 + br	13.12	1	38.79	1	61.80	1
86.74	2	13.30	1	39.63	3	62.01	1
88.10	3	13.44	2	40.74	1	62.33	1
88.80	3	14.01	1 +	41.13	4	62.73	1
89.30	2	15.09	2	41.56	2	63.56	2 d?
89.50	2	15.57	1	42.01	3	64.50	2 +
90.11	1 +	15.87	1	42.79	2	64.79	1 +
90.40	1 +	16.43	4	43.25	1	65.18	1 +
90.69	1	17.23	3	43.60	1	65.95	3
91.29	3	17.78	1 +	44.00	1	66.35	1
92.27	1	18.28	2	44.60	1 +	66.84	1

7.35	1	3393.10	2 +	3418.28	3	3448.22	1
7.69	2	93.53	1	19.75	5	48.65	1
8.27	4	93.70	8	20.13	1	50.03	3
8.73	1	94.14	2	20.94	1	50.36	1
9.45	1	94.99	1	21.20	1	51.85	1 + d
9.78	2	95.65	1 +	21.47	2	53.25	1 +
10.23	1	96.30	8	21.78	1	54.50	10
10.54	1	97.05	1 +	22.20	1	54.69	3
10.00	3	97.52	1	22.50	1 +	55.23	1
10.35	1 +	98.14	1	22.68	2	56.15	1 Nh?
10.89	4	98.50	2	23.01	2	56.70	5
11.22	1	98.98	1	23.39	2	57.32	1 +
11.45	1 +	99.51	2	23.90	1 +	58.55	1 +
11.92	3	3400.55	1	25.19	4	58.70	1 +
12.43	2	01.07	1	25.52	1	59.14	2
13.01	1	01.41	1	25.73	1 +	59.51	2 +
13.89	2	01.81	1	26.24	1	60.21	2 +
14.15	2	02.12	2	26.64	1 +	60.55	2
14.48	2	02.36	1	27.80	1	60.78	1
14.77	2	02.59	1	28.60	1	61.12	5
15.01	1	02.89	1	29.17	2	61.88	1 +
15.24	3	03.00	1	29.59	3	62.11	1 + d
15.34	2	03.40	2	30.35	1	63.51	2
15.55	2	03.60	2	30.59	1	64.03	2
16.00	2	03.91	1 +	30.89	1	64.60	1
16.03	1	04.75	1	31.93	3	65.48	2 +
16.30	1	05.10	3	32.35	1	65.70	2 +
16.70	2	05.80	3	32.71	3	66.30	1 +
16.06	1	06.95	3 +	32.98	2	67.23	1
16.60	1 +	07.30	3	34.51	8	67.66	1
17.31	1	07.90	5	35.00	1	68.00	2
17.25	3 d	08.27	3	35.39	2	68.59	4
17.18	10	09.30	1	35.60	1 +	68.94	1
17.78	1	09.60	1	36.05	2	70.04	1
17.71	3	10.35	1 +	36.21	2	70.34	2
17.93	1	10.86	2	37.06	2	71.29	4
17.36	1	11.40	2	37.55	2 + br	71.70	3
17.23	1	11.65	2	38.95	1 +	72.10	1
17.00	1	12.61	1 +	39.10	3	72.36	1
17.00	4	13.91	5	39.48	2	73.10	1
17.00	2	14.45	1	41.07	4	73.46	1
17.1	1	14.95	3	41.59	4	73.86	3
17.5	1 +	15.36	1	42.68	1	74.45	3
17.7	1	15.53	1	43.60	1	74.85	1 +
17.4	1	15.84	2	44.39	1	75.50	1 + br
17.3	4	16.57	1 +	45.72	10	76.51	1
17.5	1	17.30	3	47.10	5	77.22	5
17.1	3	17.71	1	47.40	2	77.67	1
17.2	2 +	17.79	1	47.92	2	78.06	2

3478.35	2	3503.80	1 +	3529.15	2	3564.34	3
78.65	2	03.98	1 +	30.68	1	65.81	1
78.93	1	04.27	1 +	31.14	1 +	66.19	1 +
79.91	1	04.64	4	31.87	20	66.97	1 +
80.57	2	05.06	1	32.61	1	68.15	1
80.97	2	05.30	1	34.15	1 +	68.50	1
81.79	1 +	05.60	4	34.60	2	69.45	1 +
82.24	1	05.97	2	35.11	10	69.78	2
82.90	1	06.15	1	35.30	1	70.63	1 +
84.33	1 +	06.40	1	35.74	1	71.13	1
84.80	3 d	06.93	4	36.20	15	71.54	1
85.55	1	07.67	1 +	36.71	2	71.80	1
86.05	2	09.19	1 +	37.81	2	73.16	1
86.30	1 +	09.55	1 +	38.70	15	73.45	1
87.08	1	10.22	1 +	39.50	3	73.97	4
87.35	2	11.15	2	39.76	2	74.31	4
87.72	3	11.53	1 +	40.83	2	74.76	1
88.40	1 + d	11.84	2	41.94	1	76.15	1 +
88.99	2	12.70	1	42.48	5	76.40	5
89.10	2	12.82	2	42.99	1	77.02	5
89.65	1	14.00	1	43.90	1	78.11	3
90.01	1	14.26	1	44.35	3	78.71	1
90.55	1	14.45	1	44.47	3	78.97	1
90.79	2	14.96	1	45.46	1 +	79.27	1
91.07	1	15.25	1	45.90	1 +	79.57	1
91.40	1	15.78	1 +	46.99	8	80.16	3
92.65	1	15.90	1 +	47.69	2	80.78	1 +
93.17	1 +	17.16	1 +	48.05	1	82.17	2
93.41	1 +	17.42	3	48.33	3	84.56	3
94.28	3	17.72	1 +	48.85	2	85.20	5
94.63	10 r	19.90	2 +	49.37	2	85.90	4
95.56	1	21.17	1 +	50.37	15	86.24	3
96.49	3	21.30	2	51.30	2	87.50	1
96.85	1	22.04	1	51.74	5	90.20	3
97.26	1	22.43	1	52.10	1 +	90.80	3
97.95	3	23.02	2	53.31	2	91.56	4
98.84	3	23.33	1 +	54.99	1	91.96	3
99.09	3	24.18	15	55.40	1 + d	92.25	3
99.75	1	24.77	2	55.79	1	93.29	2
3500.00	2	25.06	2	56.10	2	93.84	1
00.07	1	25.90	2	57.75	2	94.16	1
00.64	1	26.76	1	58.33	4	94.42	1 +
01.57	3	27.03	1	59.41	3	94.71	2
02.00	2	27.24	1	59.67	1 +	95.19	4
02.25	2	27.80	1 +	60.25	3	95.40	2
02.76	1	28.15	1	60.53	1	96.20	3
02.98	1	28.30	1 +	62.83	1	96.63	1
03.31	2	28.61	1	63.26	5	97.43	2
03.50	1 +	29.03	1	63.80	4	98.10	2

3598.40	2	3632.89	2	3671.82	2	3710.21	3
3600.49	5	33.15	2	72.43	4	10.89	1
01.50	1 +	33.40	1 +	72.83	3	11.80	2
02.97	2	33.90	1	73.29	3	13.99	2
03.30	2	34.45	2 +	73.98	1	15.45	2
03.85	1 +	35.40	3	74.22	5	15.70	1
04.50	1	36.87	2	74.60	2	17.10	2
04.98	1	37.42	3	75.26	1 +	17.43	1
05.25	1	38.65	1	75.77	1 +	18.27	1
05.45	1 +	39.03	1	76.18	1	18.82	1
06.27	5	40.01	2	76.71	8	19.00	1 +
06.50	1	40.39	4	77.40	1 +	19.58	1
07.05	1	40.94	1	78.18	1	20.92	1
07.33	1 +	41.21	1	78.64	3	21.82	2 +
07.82	1 +	42.80	1 +	79.39	1	22.85	1 +
08.22	1	43.66	1	80.70	1 +	24.58	4
09.40	2	44.05	3	81.06	1	25.00	1 +
11.35	1	45.55	10	82.21	1	25.60	1
12.05	1 +	46.00	3	82.54	1	26.05	1
12.44	1 +	46.74	2	85.00	2	26.34	1 +
12.89	2	47.02	2	85.90	3	26.70	1 +
13.20	2	47.70	1	88.45	1 +	27.30	1 +
14.20	3	48.55	2	89.18	1 +	28.12	2
14.83	1	48.91	3	89.68	1 +	28.89	1
15.10	1 +	50.16	1	90.70	1 +	29.35	1
16.19	1	51.00	1 +	91.33	1 +	30.75	2
16.48	1	52.45	1	93.10	1 +	30.97	1 +
17.30	2	54.00	1 +	93.66	1	31.24	1
17.74	1	54.30	1	93.99	2	31.55	1
17.86	1	55.00	1	94.50	2	32.28	1 +
18.21	2	55.76	1	94.92	8	33.50	2 + br
18.61	3	56.52	1 +	95.76	1	34.51	2
20.10	2 +	56.98	1 +	97.05	2	36.10	1 +
20.31	3	58.0	1 + br	97.40	2	37.75	1 +
20.70	1	58.61	1	97.70	1 +	37.95	1 +
22.24	1	58.83	1 +	98.04	1	38.45	1
22.73	1	60.05	1	98.31	3	38.74	1
22.90	1	60.80	1	99.11	1	39.49	3
23.52	1	61.23	1 +	3700.72	3	40.00	1
24.40	3	61.40	1 +	01.76	3	40.20	3
25.09	1 +	61.90	2	02.95	1 +	40.65	1 +
25.85	1 +	64.80	3	03.35	1 +	41.33	2
26.90	1 +	65.11	1	04.01	1 +	42.00	1
28.15	1	65.35	2	05.96	1	42.47	1 +
28.70	1 +	65.55	1 +	06.55	1 +	43.19	1
29.55	4	66.46	1	06.92	1	44.00	1 +
30.38	5	66.99	3	07.55	2	45.23	1 +
30.60	2 +	68.70	1 +	07.72	3	47.98	4
31.30	1	69.54	2	08.36	3	48.20	1 +

3748.65	1	3783.76	2	3820.03	1 +	3865.60	2
48.90	1	84.12	2	21.60	2	66.70	3
50.48	2	84.80	1 +	22.00	2	67.98	2
51.93	2	85.27	1	22.70	3	68.59	3
52.98	1 +	85.58	2	24.15	1	68.93	3
53.61	3	86.34	8	25.80	3	69.25	1
53.91	4	87.00	1	26.09	2	69.55	2
54.90	1	87.40	2	27.20	1 +	69.98	3
55.27	1 +	87.87	1	28.35	1	70.76	1 +
55.50	1 +	88.60	4	28.59	1 +	71.10	1 +
56.20	1 +	90.13	1 +	29.90	2	71.77	2
57.20	3	92.02	3	31.20	2	72.29	10
57.52	4	93.40	1	31.77	2	72.79	1
59.11	1	93.66	1	33.00	2	74.11	4
60.20	1	94.40	1	33.69	1 +	74.75	2
60.97	1 +	95.59	1	34.70	1 +	75.10	1
62.88	1	96.16	1 +	35.13	1 +	75.30	1
64.46	1 +	96.98	1 +	36.65	10	76.08	1 +
65.02	2 +	97.40	1 +	38.05	1 + br	76.27	1
65.40	1 +	97.90	1 +	38.80	2	76.64	2
66.13	1 +	98.42	2	39.67	1	77.40	1 +
66.38	1 +	98.86	1	39.92	1	77.65	1
67.79	3	99.17	1	40.66	1	78.09	2
68.20	1 +	3800.03	2 +	41.01	3	79.20	4
68.70	1 +	00.60	2 +	41.42	4	81.0	1 + br
69.18	1 +	02.08	2	42.11	2	81.60	1
69.55	1 +	02.83	1	43.17	1	82.11	3
69.85	1 +	03.75	1 +	44.48	2	82.90	1
70.31	1	04.30	3	45.28	1 +	83.20	2
70.79	1	04.55	1	46.48	3	83.44	1
71.22	2	06.00	1	47.15	2	86.00	1 +
71.53	1 +	06.41	3	48.51	1	86.50	1 +
72.50	1 +	07.65	1 +	49.52	3	87.67	2
72.80	1	08.05	1	50.19	1	88.20	1
73.20	3	09.18	2	50.63	1	88.55	3
73.48	2	09.60	1	52.19	1	89.14	3
73.85	1	09.93	2	53.17	4	89.90	1
74.90	2 d	10.10	1	55.05	1	91.15	1 + Nh?
77.06	1	10.45	1	55.75	1	92.06	3
77.61	2	11.00	1 +	57.61	1	93.03	3
78.20	1 +	12.42	3	58.23	2	94.67	1
79.17	1	13.27	2 +	58.54	2	95.50	3
79.39	2	13.80	3	59.37	1	96.02	1
79.78	1 +	14.75	1	59.74	1	96.32	1
80.44	1 +	16.36	2	60.00	1	96.78	1
81.10	1	16.89	8	62.81	2	98.70	10
81.61	2	17.60	2 +	63.35	2	99.30	1
82.30	1 +	18.90	2	64.20	2	3900.00	1 +
83.03	2	19.59	1	64.99	1 + d	00.54	1

24	1	3940.87	1+d	3976.35	1	4019.55	1
33	1+	42.22	1+	78.73	10	19.70	1
34	1	42.65	4	79.60	3	21.03	2
35	1	44.83	20	81.54	1	23.29	1
33	2	45.42	1	82.10	8	23.85	2
71	1	45.77	1+	82.66	1	24.60	1
55	1	46.05	1	83.83	10	25.02	1
55	1+	46.49	1+	84.39	4	25.75	1
66	1	47.07	3	84.85	2	27.91	3
99	1	48.73	1	86.20	1+	28.52	4
00	1	49.40	1+	87.21	2	29.56	1
61	1	49.85	1	87.71	1	31.23	1
55	1+	50.52	4	88.37	1+	32.62	4
55	1	51.36	1	89.06	2	32.99	2
55	1+	51.47	1	90.50	2	33.81	4
61	1	51.90	1	90.96	1	36.48	3
00	2	52.25	1	91.50	3	37.52	1
62	2	52.63	1	92.04	1	37.78	1
00	2	53.26	1	93.50	1+	38.65	3
99	4	53.63	1	93.76	2	38.97	2
00	4	54.15	1	94.49	1+	40.40	1+
88	4	54.68	3	94.70	1	41.17	1+
11	1	55.25	1	95.50	1+	42.11	3
88	2	55.60	1+	95.90	1	43.55	1+
88	2	56.39	1	96.16	1	45.40	1
99	1	56.95	1	96.90	10	46.16	20
00	1+	57.36	1	98.25	1	47.56	1
88	4	57.93	4	4000.02	1	47.87	1
00	2	58.59	1	00.69	20	48.50	2
55	1+	58.99	1	01.25	1	49.05	2
00	1	59.51	2	01.71	1	49.51	2
55	1	59.85	1	04.48	1	50.73	10
23	3+(Fe)	60.97	1	04.60	1	51.99	1
88	2	61.90	1+	06.00	2	52.55	1+
55	1	62.71	3	06.25	2	53.33	1+
00	3	63.30	1	07.30	1+	53.50	1+
11	2	63.95	2	07.92	2	54.02	1+
99	5	64.85	1	08.64	1+	55.28	3
23	3	65.25	1+	10.23	2	57.54	2
44	2	65.97	1+	11.46	3	60.71	1
33	2	66.50	1	12.70	1	61.70	1
77	2	67.65	2	12.99	1	63.47	1
11	1	68.56	20	14.00	2	65.30	1
22	2	70.13	1	14.87	3	65.52	1
99	1	71.31	2	15.33	1	66.95	1+
55	3	71.77	1	17.00	1	68.70	1+
00	2	72.54	2	17.20	1+	69.85	1+
88	1+	73.45	1+	17.93	1	70.30	1+
00	1+	74.03	2	18.62	1	71.20	1

4072·80	1	4120·81	1 +	4166·0	1 + br	4218·24	10
73·30	8	21·90	2 +	66·39	1	18·73	1
74·17	1	22·51	1	67·40	1	21·30	15
77·05	1	24·82	5	68·15	20	22·38	3
77·50	1 +	26·29	2	69·23	1 +	24·83	1
78·14	20	28·45	3	69·40	1 +	25·31	10
79·40	1	29·30	2	70·50	1	30·40	1 +
79·76	1	29·61	5	70·70	1	31·00	1 +
81·97	1	30·53	2	72·11	3	31·25	1 +
82·17	1	31·20	2	76·80	1 +	32·19	4
83·24	1	33·00	2	76·97	1 +	33·13	1
83·98	1	33·52	3	78·75	1	33·60	1
84·45	1	34·01	3	81·14	1	34·30	1
85·29	2	34·31	2	81·41	1	34·99	2
85·50	3	34·90	1	81·76	1	36·40	1
85·90	1	36·35	1	82·10	1	36·74	1
87·34	3	37·09	1	82·57	2	37·70	2
87·96	1	37·52	1	83·85	10	38·20	1
89·65	1	38·70	2	86·60	1 +	38·60	1
90·10	1	39·70	2	87·00	20	40·02	5
90·61	1	41·67	4	88·49	1	43·59	1
91·68	2	43·28	10	89·09	1	44·95	1
91·92	2	43·86	1	91·10	2	46·09	5
93·81	1	45·78	1 +	91·80	8	47·52	4
94·50	1 +	46·22	8	94·00	1	48·60	2 +
96·27	3	47·30	1 +	95·01	10	50·57	1 +
96·84	1	48·15	1	95·39	3 +	50·99	1
97·00	1 +	49·10	1 +	96·75	1 +	51·45	1 +
99·01	1	49·99	1	97·52	1	51·90	1 +
99·40	1 +	50·54	1 +	98·18	5	52·53	1 +
4100·05	1	51·02	1	99·19	1	52·97	1 +
01·58	1	52·60	3 +	4201·17	1	56·13	1 +
02·10	1	53·30	2	01·48	5	56·49	8
03·50	15	53·52	1 +	02·39	4	57·88	1 +
04·06	4	54·38	2	04·15	1	58·30	1
05·20	3	54·70	1	05·21	5	58·77	2
06·00	1 +	55·93	1	05·83	1 +	59·40	1
06·14	1 +	56·55	1 +	06·69	4	61·37	1
06·54	1	57·14	1	07·38	1	61·76	1
86·85	1	58·02	1 +	07·83	2	63·10	1
07·34	1	58·20	1 +	08·52	1 +	63·70	1
07·60	1 +	58·65	1 +	11·40	3	64·95	1 +
11·51	10	59·49	2	11·89	30	65·99	2
13·20	2	60·39	2	13·32	8	66·30	1
14·24	2	62·39	2	13·76	1	66·70	1
14·84	1 +	63·19	1	14·54	1	68·08	1
15·55	1 +	63·96	1 +	15·30	10	68·45	2
18·17	1 +	64·70	1 +	16·02	1	69·20	1 +
19·48	3	64·90	1 + br	17·10	1 +	69·73	2

1 +	4316.91	1	4366.28	2	4419.10	1
1	18.10	1	66.90	2	20.48	1
1	19.15	1	67.35	1	21.86	2
3	19.48	1	68.45	1	22.95	1
1	22.35	1	68.77	1	23.78	1 +
1	22.71	2	69.76	1	26.00	1
1	23.92	2	70.26	1 +	26.35	1
2	24.80	1 +	71.47	1	27.03	2
1	25.29	3	74.42	3	31.18	2
3	26.04	2	74.98	3	32.79	1
1 +	26.55	2	75.49	3	35.95	2
1 +	26.94	1	77.58	1 +	36.82	1
2	28.10	2	78.51	1	38.55	1 +
1	29.08	3	79.00	1	38.78	1 +
1	30.03	2	80.40	2	39.30	1
1	33.10	1	80.66	1	40.32	1
1	33.87	1	81.36	1	43.01	1
1 +	34.23	1	82.15	1	44.03	1 +
1 +	34.52	1	83.34	1	44.45	1
1 +	34.78	1	84.49	2	44.80	3
2	35.45	1	85.44	2	45.19	1
1	35.84	1	86.14	1	46.33	1 +
3	36.17	1	86.99	1	48.40	2
1	37.65	2	89.95	2	48.81	1 +
8	38.43	1 +	95.14	3	49.33	2
1	39.81	3	96.24	1	49.91	10
1 +	40.59	1	97.03	1	52.60	1
1 +	41.15	1	97.64	1	53.10	1 +
1 +	44.42	1	98.00	1	55.80	3
1 +	44.75	1 +	98.27	1	60.10	1 +
1	46.52	3	98.67	1	60.46	1
1	47.87	4	99.20	1	61.35	1 +
3	48.54	1	99.85	2	62.55	1 +
1	49.25	1	4400.27	2	63.03	1 +
1	54.30	1 +	02.30	1	63.50	1 +
1	54.50	1 +	02.91	1	64.35	1 +
1	55.50	1	03.73	1	64.93	1 +
10	56.32	1	04.12	1	65.49	1
1	56.92	1	05.75	2 +	65.96	1
1	57.33	1	07.33	1	66.47	1 +
1	58.67	4	07.71	1	67.63	1 +
1	60.40	2	08.22	3	68.05	2
1	61.53	2	09.59	8	68.31	3
1	62.45	2	11.16	1	69.08	1
1	63.10	2	11.54	1	70.79	1
2	63.50	1 +	12.90	1 +	71.30	1
1	64.23	2	16.05	1 +	71.68	1
1 +	64.45	2	16.63	1 +	72.31	1
1	65.80	1	18.28	2	73.72	1

4474.75	1	4516.10	1	4555.2	1 + br	4604.51	1 +
75.66	1	17.10	3	55.41	2	06.23	2
76.80	2	18.70	3	56.66	2	09.25	1
77.32	1	19.14	1	57.6	1 + br	10.71	1
77.69	1	20.00	2	58.34	2	11.10	1
79.29	1	20.9	1 + br	59.80	1	11.86	1
79.70	2 +	21.8	1 + br	60.30	1 +	12.46	10
80.85	2	22.85	1	62.60	1 +	13.65	1
82.15	2	23.20	1	63.70	1 +	14.01	2
82.50	2	23.68	1 +	65.30	4	14.99	2
83.63	1	24.15	1 +	66.41	1	15.74	2
84.55	3	24.95	1 +	66.76	1	17.05	1
85.24	1	25.27	2	67.27	2	17.42	3
86.40	2	26.00	1	67.71	1	18.92	1
87.37	1 + br	26.26	2	68.60	1	20.19	4
88.02	1	27.09	1	69.65	1 +	20.50	1
88.36	1	27.42	1	69.98	1 +	21.15	1
88.71	2	27.80	2	70.5	1 + br	21.60	2
90.63	1	27.94	3	71.79	1	22.52	2
91.21	1	28.52	1	72.54	1	24.30	2
91.52	1	29.97	1	74.03	3	24.60	2
92.31	1	30.66	1	74.50	1 +	26.19	1
93.27	1	31.76	2	76.79	3	27.09	1
95.23	1 +	32.7	1 + br	78.00	8	27.30	1
95.97	1 +	35.05	1 + br	78.73	1 +	27.63	1
96.25	1	35.53	1	79.6	1 + br	28.28	2
96.57	2	36.30	1 +	81.6	1 + br	29.30	1 + br
97.80	1	36.88	1 +	83.24	2	31.70	2
98.63	2	38.36	1	83.55	1	34.96	1
99.13	1	38.93	3	83.83	1	35.50	2
99.45	2	39.31	1	84.10	1	35.79	1
4500.10	1	40.45	1 + br	84.46	1 +	36.40	1
00.44	1	41.87	3	85.90	2	37.30	2
02.77	2	42.59	1	86.17	2	37.79	2
03.41	4	44.30	1 +	86.38	2	38.70	1
05.80	1	45.52	2 +	86.82	2	39.00	2
06.25	1	46.65	1 +	88.10	3	40.25	1
07.11	2	46.99	1 +	88.49	1	42.43	1
07.98	1	47.63	1	89.53	15	42.96	1
08.29	1	50.17	1	90.23	1	43.63	2
10.10	1 + d	50.70	1	90.75	2	44.30	1
10.70	1	51.08	2	91.95	3	44.76	1 +
11.05	1	51.54	1	95.31	2	46.90	2
11.82	1	51.85	1	96.93	1	47.47	2
11.96	1 +	52.43	1	97.67	1 +	49.00	1
12.38	1	53.00	1	99.48	1 +	49.65	1
13.77	1	53.33	2	4600.04	2 +	50.36	2
15.22	1	53.85	1	00.87	1	51.72	3
15.73	1	54.45	1 +	02.71	1 +	53.61	1

93	2	4698.89	4	4764.55	1 +	4820.90	1
60	1	99.53	1 +	64.90	1 +	21.50	2
0	1	4701.30	1 +	66.65	1 +	22.13	1
66	2	01.49	1 +	67.35	1 +	23.00	1
60	1 +	02.30	1 +	69.82	2	23.90	2 +
99	2	02.90	1 +	71.00	1 +	24.40	1
9	2	03.64	3	72.12	3	25.18	3
8	1	05.90	1 +	73.40	1 +	26.75	2
1	2	06.94	2	73.95	1 +	27.30	1 +
5	1 +	08.00	2	74.55	1 +	29.10	2
0	1 +	09.40	2	75.03	2	29.33	1
0	1	11.28	1	76.01	4	29.87	2
4	4	11.81	1	77.10	1 +	31.06	1
0	1 +	12.72	1	79.60	1 +	32.25	1
3	2	14.99	1	80.40	1 +	32.60	3
0	2	17.08	1	81.24	1 +	33.45	1
9	1	18.8	1 +	82.05	1 +	33.94	2
1	1	19.05	1	83.67	1 +	37.15	1
0	2	21.42	3	84.80	1 +	37.88	1
4	1	23.34	1	85.11	2	38.57	1 +
3	1 +	24.10	2	85.50	1	39.80	1 +
7	2 +	24.41	2	86.50	1 +	40.34	1
0	3	26.50	2 d	87.14	4	40.65	2
9	1	26.95	1 d	91.50	3	41.98	2
7	2 +	27.32	3	92.15	1 +	42.35	1 +
9	3	28.60	1 +	93.10	2 +	43.63	1
0	1 +	29.10	2	95.10	1 +	43.96	1
0	1 +	29.30	1 +	97.83	1	45.03	1
9	1 +	32.01	5	98.55	1 +	45.90	1
1	1	32.30	1	4800.86	3	51.65	2
1	1 +	34.6	1 + br	02.25	1 +	52.70	2
2	2	34.8	1 + br	02.75	1	55.69	2
2	2	38.68	1	03.75	1	56.42	2
1	1 +	41.10	2	04.73	2	57.50	1 +
2	2	41.70	2	07.19	1	59.20	1 +
1	1	42.60	1 +	08.14	2	59.35	1 +
1	1	42.90	1 +	08.95	1	60.24	1
1	1 +	43.21	2	10.47	2 +	60.87	1
3	45.99	3		11.00	1	61.54	1
1	48.4	1 + br		12.92	4	61.92	1
1	52.5	1 + br		14.35	1	62.26	1 +
2	54.22	1		16.39	1	65.05	1 +
1	55.18	2		16.73	1	65.30	1 +
2	56.86	2		17.22	1	65.87	2
1	57.63	1		17.66	1	67.94	1
2	60.21	4		18.39	1	68.24	2
2	61.5	1 + br		19.22	3	69.83	1
1	62.55	1 +		20.27	1	72.65	1
1	1 +	64.0	1 + br	20.50	1	73.34	2

4874.00	1	4932.65	1	4999.19	1	5092.41
74.77	1	33.10	1	5000.29	1 +	5100.01
75.65	1	34.03	2	02.97	1	02.24
76.11	2	36.26	1	04.03	2	02.51
78.92	1 +	37.00	1	04.44	3	05.51
79.36	1 +	37.52	1 +	07.55	1	06.50
80.01	1	40.60	1	10.76	2	07.05
80.34	3	41.31	1	11.70	1	08.18
82.21	2	43.02	1	18.15	2	08.60
84.32	2	43.60	1 +	19.50	1 +	10.48
84.73	2	44.13	1 +	22.29	3	12.88
85.31	1	44.60	1 +	24.20	2	13.60
86.35	1	45.69	1 +	24.70	2	20.18
88.27	4	46.48	1	28.01	2	22.57
89.52	3	48.38	1	29.40	1	23.26
89.99	1	49.50	1	32.81	2	28.45
90.30	3	51.18	1	33.15	2	30.00
92.80	1	51.60	1	34.55	1 +	30.51
93.15	1 +	52.45	1 + d	37.08	1 +	31.20
93.88	3	53.53	1	37.90	1 +	32.10
96.04	2	54.51	1	39.23	1	32.37
97.31	1	56.90	1 +	40.37	1	35.19
97.54	1	57.59	30	40.71	1	36.45
99.41	2	59.20	1	42.20	1	39.71
4902.10	2	59.79	2	42.80	4	41.9
03.85	1	61.57	1 +	43.80	1	45.35
04.51	1	61.95	1 +	46.48	1	47.15
06.45	2	63.26	1	47.44	2	47.35
07.26	1	64.85	1 +	50.38	2	49.13
07.65	1	68.05	1 +	52.20	1	49.80
09.20	1	69.21	1	53.40	1	50.32
09.99	1	70.01	1 +	53.53	2	51.47
11.34	1	71.95	1	55.63	2	51.75
11.69	1	73.74	2	56.00	1	55.40
12.73	1	74.15	1	56.40	1 +	56.90
14.91	2	75.15	2	60.90	1	59.10
16.60	3	76.56	1 +	61.78	2	59.28
17.35	2	80.28	1	63.60	1	61.15
17.96	1	82.10	1	65.72	1	64.24
18.42	2	84.77	1	70.83	3	65.51
19.72	1 +	85.69	2	74.00	1 +	66.98
21.67	2	87.80	1 +	74.42	1 +	68.24
22.39	2	88.30	1 +	77.82	3	69.80
22.74	1	91.97	1 +	80.34	1	70.31
23.33	3	92.81	1 +	80.94	1	72.02
27.51	1	93.73	1 +	85.10	1 +	73.97
29.50	1	95.00	1	87.05	1 +	75.22
30.76	1	95.54	1	88.60	1	77.71
31.17	1 +	98.65	1	90.58	3	80.24

5184.62	1	5290.17	1 +	5407.96	1	5577.61	1 +
85.30	3	98.01	3	09.9	1 + br	83.40	1
85.78	1	5300.49	2	11.0	1 + br	92.55	1
87.16	1	01.05	1	16.76	1	97.60	1
88.65	2	01.77	5	18.94	1	5600.91	3
90.0	1 + br	06.83	1	19.32	3	05.86	2
93.06	8	09.20	3	20.95	1	13.47	2
97.02	1 +	10.24	1 +	23.50	3	27.74	1
97.84	3	12.02	1	24.47	2	30.00	1 +
99.70	1 +	12.81	2	25.45	1 +	34.97	1 +
5200.98	1 +	17.17	1	25.98	1 +	39.73	4
03.68	1 +	18.31	1 +	26.55	1	41.76	2
05.87	1	19.42	1 +	26.90	3	45.78	1
07.07	1 +	20.07	1 +	43.55	2	46.24	3
12.20	1	21.86	1 +	51.30	4	52.20	3
12.59	1 +	22.40	1 +	55.65	3	60.50	1 +
14.57	1 +	24.88	3	60.80	1	64.10	1 +
15.58	1 +	26.88	1	69.32	2	66.64	1
16.47	1 +	28.19	3	72.13	2	71.51	1
20.48	1	29.10	1 +	72.84	1 +	77.90	1
20.86	1	30.90	1 +	77.98	1 +	78.53	1
22.13	1	35.20	1 +	80.17	1 +	83.27	1 +
27.97	1	36.71	1	84.0	1 + br	85.78	1
36.39	2	36.96	1	90.5	1 + br	92.6	1 + br
38.51	1	37.60	2	92.0	1 + br	92.85	1 + br
41.05	1	40.49	3	97.04	1	94.7	1 + br
41.65	1 +	43.33	1	99.75	1 +	96.10	2
46.55	1	43.75	1	5502.99	1	98.92	2
47.10	1	45.75	1	06.75	2	99.60	2 +
47.87	1 +	47.79	1	08.55	1 +	5703.13	2
48.30	1	48.55	1	11.45	1 +	08.05	2
48.65	1 +	52.31	2	12.12	1 +	18.70	3
49.8	1 + br, d	56.35	1 +	15.61	2	26.01	1 + br
55.20	1 +	61.54	1	20.07	1 +	28.9	1 + br
58.55	1	68.40	2 +	28.25	2	33.18	1
60.07	2	69.46	2	30.78	1	40.45	3
60.75	3	70.80	1	32.35	1 +	45.79	3
67.30	2	71.68	2	34.60	1 +	50.75	1 +
69.71	3	73.20	1	35.48	1 +	53.9	1 + br
72.44	3	76.30	2	38.50	1	54.5	1 + br
74.29	1	80.87	1 +	42.43	1	58.49	1
75.50	3	81.55	1 +	47.49	3	59.04	1
77.55	1	82.04	1 +	59.34	1	60.05	1 +
78.05	1	85.02	1	62.70	1 +	67.20	1 +
78.52	1 +	85.82	2	63.40	1	5805.77	2 +
79.89	3	89.77	3	64.35	1 + br	07.89	1 +
80.57	1 +	92.24	2	65.0	1 + br	32.25	1 +
82.22	3	95.75	3	66.55	1 +	35.1	1 + br
85.15	2	5400.11	1	68.35	1 +	40.5	1 + br

5845.57	1+	5986.30	1+	6259.31	5	6475.14	1+
46.35	1+	88.81	3	60.63	1	83.80	3
56.3	1+ br	6003.56	1+	91.89	1	86.82	3
59.82	1+	09.21	1	6317.46	1	6519.40	1+
64.30	1+	11.06	2	23.40	1+	48.50	1
68.40	2	17.55	1	31.31	1+	58.30	2
93.50	1+	31.25	1	38.25	1+	65.40	1+
5902.72	1	58.45	1+	43.52	1	79.62	5
05.48	1+	85.30	1	87.11	3	94.45	1
09.40	1+	88.49	2	96.87	2	6643.65	1
15.40	2	6127.37	1+	6402.65	1+	58.65	1+
22.63	1+	33.85	1+	22.17	3	61.94	1
24.80	1	58.54	1+	36.80	1+	68.17	2
46.08	2	65.80	1+	61.10	1+	6748.20	1+
64.75	2	68.67	2	68.80	1+	6835.7	1+ br
74.75	3	96.50	1+	72.24	1+	99.70	1
85.14	1	6229.97	1				

XXII. Er. Erbium.

Ältere Messungen: J. M. Eder und E. Valenta, Wiener Ber. 119 IIa (1910) (Rot).

Material: Erbiumnitrat aus Oxid von Prof. P. T. Cleve, auf Gaskohle.

Verunreinigungen: Ad, Tm, Nh.

Linienzahl: 2321.

2341.96	1	2509.16	1 Tm	2616.99	1	2677.69	1
43.59	1	14.03	1	21.23	1	79.64	1 Tm
45.20	1	35.06	1	21.85	1	88.50	1
54.30	1	37.09	1	24.30	2	2700.74	1
58.63	1	47.37	1	24.44	2 Tm	01.79	1
77.89	1	61.75	1 Tm	27.88	1	04.49	1
86.68	1	64.86	1	40.86	1 Tm	11.62	1
87.27	1	77.48	1+	47.28	1+	12.20	2
97.39	1	79.72	1	51.49	1	13.33	1
2400.45	1	81.73	1	53.81	1	16.65	1+
20.39	1	86.86	2	54.19	1	21.25	1 Tm
25.36	1	87.15	2	55.34	1	21.66	1
26.29	1	87.45	1	57.07	1	24.75	1
27.40	1	92.66	1	60.18	1 Tm	26.30	2
46.47	2	95.15	1	63.55	1	30.17	2
60.80	1	2602.76	1	65.16	1	31.65	2
67.32	1	05.01	1	66.41	1	39.37	3
78.44	1	12.47	1	70.34	3	50.29	3
2503.55	1	14.65	1	72.34	3	51.02	1
07.71	1	15.50	1	75.45	2	52.78	1

68	1	2834.03	3	2897.62	4	2953.84	1
09	3	37.21	1	2902.74	1	54.46	1
73	4	38.82	3	03.55	1	55.72	1 d
50	1	40.75	2	04.59	8	56.55	1
81	1	40.94	1	06.60	2	57.05	1
73	2	41.45	1 Tm	08.62	2	59.00	1
49	2	42.01	1	09.67	3	60.25	1
13	3	42.50	1	10.49	8	62.25	1
74	1	44.77	1 Tm	11.15	2	62.46	1
06	2	45.95	1	11.52	1	62.63	2
69	1 Tm	46.36	1	12.93	1	63.82	2
30	1	47.13	1	14.77	1	64.02	2
67	1	48.15	1	15.44	1	64.36	1
15	1	48.45	3	15.72	3	64.64	5
22	1	49.00	1	18.95	1	64.95	1
34	1	50.75	2	19.35	2	65.33	2
06	2	55.50	3	20.34	2	65.98	2
15	1 Tm	58.65	2	22.55	1 +	66.28	1
22	2	59.93	3	26.46	1	68.05	1
53	1	60.35	1	26.83	2	68.55	1
81	2	62.70	1	27.45	1	68.89	4
55	1	66.47	1	27.81	2	70.18	2
30	1 Tm	69.33	3	27.90	1	71.08	1
27	1	70.65	1	28.35	2	71.38	1
97	1	71.78	1	28.52	2	71.74	1
73	1 Tm	72.95	1	29.38	3	71.85	1
37	1 Tm	73.14	1 Tm	29.82	2	72.40	3
63	1	73.91	2	30.75	2	73.86	2
82	1	74.47	1	31.67	1	74.32	1
63	2	74.88	2	31.76	1	74.58	3
96	2	77.36	1	32.46	1	75.55	1
65	1	78.63	1	32.67	1	75.80	3
46	2	79.00	1	34.60	1	80.05	1
85	2	79.34	1	34.71	1	81.58	1
47	1	79.47	1	36.10	1	83.17	2
57	1 Tm	82.71	1	39.40	1	83.33	2
96	1	86.20	1	39.55	1	83.89	2
44	1	86.59	1	41.27	1	85.62	1
94	1	86.95	1	41.41	1	88.32	1
30	3	87.18	2	41.80	1	89.37	2
55	1 +	88.25	2	42.30	2	89.66	2
45	1	89.10	1	44.16	2	90.64	2
00	1	91.45	1	45.14	1	93.35	1
00	1 Tm	91.50	1	45.37	3	94.19	1
46	1	93.63	1	46.71	3	95.55	1
53	1	94.04	3	48.90	2	96.15	1
30	1	96.05	1	49.33	1	96.46	2
90	1 +	96.68	1	50.17	1	98.00	1 +
16	1 +	97.08	4	51.37	2	98.15	2

3000-12	1+	3054-52	3	3090-72	1	3129-02	1
02-06	1	55-05	1	92-05	1	30-13	1
02-51	4	56-17	1	92-27	1	31-19	2
02-76	4	58-30	1	93-25	3 r	31-37	5
03-46	1	58-73	1	93-90	2 -	32-14	2
03-92	2	61-42	2	94-39	1	32-60	3
05-15	1	61-77	2	95-39	1	32-87	3
09-54	1	62-34	1	95-95	2	33-38	1
09-76	1	62-85	1	96-27	1	33-99	3
10-39	2	62-94	1	98-69	2	35-70	2
11-25	2	63-45	1	99-30	3	36-39	1
12-55	3	64-96	2	99-71	2	36-87	1
13-85	1	65-10	2	3101-77	1 -	37-94	2
14-02	1	66-35	3	02-34	1	38-58	2
14-21	1	67-62	1	02-78	2	40-28	1
14-74	1	68-49	1	03-53	1	41-24	5
15-39	3	69-35	2	04-14	1	41-91	2
16-91	3	70-38	1	04-55	1	42-10	1
17-83	3	70-90	5	04-85	1	42-92	2
19-85	2	72-26	2	05-10	1	43-35	2
22-81	1	72-68	5	05-64	1	43-74	2
25-35	1+	73-16	2 -	06-55	1	44-41	3
26-02	4	73-50	4	06-89	3	44-60	2
26-74	1	73-81	1	08-22	1	45-05	1
27-93	1	74-13	1	10-98	2	46-22	1
28-36	3	74-56	1	12-15	2	46-65	1
30-56	1	75-46	1	13-61	4	46-93	1
31-40	4	76-26	1	14-46	1	48-40	1
33-19	1	76-95	1 -	15-17	2	48-58	1
36-09	1	77-27	1	15-61	3	49-71	1
36-31	3	78-35	2	16-13	1 -	49-99	1
36-67	1	78-99	3	17-02	3	50-69	3 v
38-34	1	79-70	1	17-55	1	51-17	3 v
39-34	1	79-81	1	18-46	1	52-50	3
40-44	1+	80-06	1	18-57	1 -	54-05	1
41-73	1+	80-30	1	18-90	2	54-42	5
42-45	1+	81-25	1	19-13	2	55-65	1
43-23	1	81-49	2	19-61	1	56-03	1
44-33	1+	82-20	4	20-94	1	56-63	1
46-98	1	84-15	4	22-00	3	57-44	3
47-54	1+	84-48	1	22-79	8	58-55	1
47-93	1+	85-16	1	23-18	2	59-70	1
48-50	2	85-26	1	23-67	1	60-26	1
49-32	1	86-14	1	24-23	1 -	60-47	2
49-40	1	87-25	2	24-97	1	60-89	1
50-07	2	87-91	2	25-27	2	61-45	1
50-99	2	88-85	2	25-76	3	63-30	1
51-50	1	89-16	1	26-31	2	64-63	1
53-89	2	89-88	1	27-45	2	65-55	1

2	1	3210.70	1	3263.35	1	3302.58	3
0	2	11.40	1	63.57	1	04.09	3
7	1	11.58	1	64.25	1	04.20	2 +
9	2	14.57	3	64.91	5	05.22	3
6	1	15.37	1 +	66.76	3	07.60	2
5	2	17.94	1	67.23	4	08.84	1
0	1	19.10	1	67.51	1	09.03	1
2	2	19.87	1	68.35	1	09.95	2
2	3	20.90	4	68.55	1	10.74	2
1	1	21.81	1	68.94	1	11.25	1
1	1	23.47	3	69.10	1	11.69	1
1	1	26.25	1	69.54	3	12.60	10
1	1	27.29	3	72.24	1	13.65	2
2	2	30.07	2	72.49	1	13.83	2
1	1	30.26	2	73.22	1	14.56	2
1	1	30.72	8	73.50	2	15.08	2
1	1 +	31.14	1	74.53	1	16.20	1
2	2 +	31.40	1	74.90	1	16.51	3
4	4	31.65	1 +	75.56	2	17.00	1
4	4	32.18	3	75.82	1	17.58	2
3	3	33.52	1	76.19	1	18.35	2
3	3	34.45	1	76.95	2	18.91	2
1	1	34.94	1	77.50	1	19.26	1
2	2	35.55	2	77.83	2	19.68	1
1	1	36.95	2	78.32	3	19.89	1
1	1	38.10	4	79.48	5	20.00	1
1	1	40.36	3	80.38	5	23.37	5
2	2	40.64	3	81.36	1 +	27.04	1
1	1	41.66	3	81.85	1	27.73	1
1	1	43.40	3	83.02	1	28.45	1
1	1	43.60	2	83.53	2	29.45	1
1	1	44.95	1	83.88	1	29.82	3
1	1	47.63	2	84.15	1	31.22	1
1	1 +	48.61	1	85.73	2	31.70	2 + d
1	1 +	49.44	3	86.29	2	31.95	2
1	1	50.35	1	86.88	3	32.86	4
3	3	50.98	1	88.10	2	33.01	2 +
1	1	51.76	1	89.49	3 Ad	33.96	1
1	1	54.97	1 +	89.99	1	34.45	1
1	1	55.92	1	90.20	1	35.02	1
2	2	56.49	2	90.81	1	35.46	1
2	2	56.83	1	91.14	3	35.56	1
1	1	57.90	1	91.42	2	36.62	1
1	1	58.18	2	92.45	1	36.91	2
1	1	58.64	2	96.07	1	37.39	3
3	3	59.22	5	99.55	1	37.55	1 +
1	1	61.51	1	3300.73	1	37.90	3
2	2	61.80	1	01.22	1	38.13	2
1	1 +	62.93	3	02.06	2	39.26	1

3339.75	1 +	3376.25	2	3413.50	1	3450.61	1
40.16	3	77.15	2	13.83	1	51.10	1
40.37	1	78.60	1 +	13.90	1	51.34	1
40.64	2	78.88	1	16.25	2	52.44	1
41.73	2	79.16	2	16.61	2 d	53.18	3 + d
41.98	3	81.24	2	17.42	2	53.81	3
42.28	2	81.50	3	17.75	3	54.28	1 +
43.02	2	81.95	1	18.88	1	54.45	1
43.23	1	82.21	2	20.11	1	55.44	1
43.57	1	83.05	1	20.34	2	56.14	6
43.80	2	83.35	1	21.12	1	56.66	1
44.31	1	84.22	1	21.20	1	57.24	1
44.50	2	84.41	1	22.55	1	57.39	1
44.86	1	85.23	10	22.76	1	59.00	1 + d
45.57	1	87.85	1	23.01	1	59.50	1
46.12	4	89.73	2	25.22	5 r	61.13	1
46.48	2	89.88	3	25.76	2	61.54	2
46.80	1 +	91.15	1	28.19	1 +	62.38	4 Tm?
47.05	1 +	91.90	1	28.54	3 r	62.73	1
47.74	1	92.13	4	29.35	1 +	64.64	4
47.84	2	93.15	1	30.07	3	65.27	1
48.00	2	93.35	1	31.23	1	69.90	3
48.26	3	93.70	2	31.33	1	71.06	1
48.87	2	94.24	2	32.45	1	71.87	4
50.21	3	94.54	2	33.27	3	72.97	1
50.42	3	95.00	2	34.21	1	74.42	2 + d, Nh?
51.46	2	95.43	1	34.52	1	74.86	1
54.73	1 +	95.94	1	34.76	2	76.45	1
55.00	1	96.22	3	34.90	1	77.20	1
56.35	2	97.50	3	36.45	1	78.06	2
58.29	2	97.65	2 Tm?	37.10	1	79.57	3 r
60.62	1 +	97.97	1	37.57	1 +	80.60	3
61.17	2	98.16	1	37.77	2	80.85	1 +
61.81	2	98.41	2	38.45	2	81.90	1
62.78	4 Tm	99.08	3 + r, d	38.60	1	82.75	1
64.22	4	99.75	1	41.25	3	84.71	2
64.56	1	3400.10	1	41.65	3 r	84.99	2 d, Nh?
65.68	1	01.36	2	42.26	1	85.31	2
66.40	1	02.00	3	42.50	1	86.02	4 r
66.85	2	03.00	1 d	42.79	3	86.96	3 r
68.21	8	03.85	1	43.87	2	87.52	1
69.12	1	04.27	1	44.43	1	88.66	1
69.77	1	07.12	2	45.60	1	89.50	2
70.72	3	07.95	2	45.70	1	90.21	2
72.92	20	08.56	1	46.52	1	90.39	2
73.79	1	08.83	2	47.00	2	92.65	2
74.32	5	09.36	1	47.66	2	93.30	1
74.66	1	10.01	2	48.18	2	93.84	1
74.80	1	12.02	1	48.69	1	94.27	1

3494.64	1	3536.15	2	3588.89	2	3629.54	2
94.93	1 d, Nh?	36.33	1 Tm	89.09	2	30.01	1
96.99	3	36.90	1 +	90.91	3	30.23	2
99.28	15	37.40	1	91.30	1	30.46	2
3500.10	1	38.65	2	91.55	1	31.94	1
01.30	1	39.42	2	92.18	2	32.22	5
02.95	3	39.69	3 d	93.30	2	32.65	1
03.54	1	43.15	3	94.28	1	32.93	2
04.22	1	45.30	1	95.20	1	33.40	1
04.64	1	45.97	2 +	95.65	1	33.70	6
05.22	3	47.67	3	95.97	2	34.81	2
05.85	2	48.36	3	96.40	1	35.47	1
06.96	1	49.66	2	97.94	1 +	36.50	1 + d
07.35	1	50.00	4	99.02	1	37.30	3
07.63	1	50.36	1	99.62	4	38.82	4
07.80	2	51.95	2	99.99	6	39.13	1
08.53	4	52.46	1	3600.54	1	40.35	1
08.97	1	53.36	3	00.93	2 r	41.41	3
09.05	1	54.47	2	01.70	1	42.05	2
11.85	1 +	56.54	1	04.86	2	43.77	2
12.05	1 +	57.00	2 +	05.05	3	45.55	3
12.85	1	57.24	1 +	05.85	1	46.09	5
12.93	1	57.99	1 +	06.20	2	46.93	2 +
13.20	1	58.17	2	07.56	2	47.36	1
15.06	3	58.86	2	08.33	2	49.12	1 +
15.72	1 d, Nh	60.05	4 r	09.53	1	49.32	1 +
16.15	1	63.34	1	12.57	1	50.53	5
16.61	1	63.57	1	12.73	1	52.71	3
16.83	1	63.70	1	13.03	1	53.02	4
17.06	1	65.33	2	13.27	1	53.76	1 Tm
18.02	1	66.06	1	14.80	2	54.50	1
18.31	3	66.28	1	16.21	2	56.51	1
19.25	1	66.62	2	16.75	10	58.60	1
20.20	3	67.50	1 Tm	17.29	1	58.96	1
22.66	1	69.40	1	17.98	5	59.27	1
24.15	2	70.91	2	19.08	5	59.71	2
25.08	3 r	71.87	2	19.56	1	60.68	1
26.53	2	73.25	2	20.35	2	60.92	2
26.92	2	74.01	2	21.12	2	61.85	1
27.26	1	76.42	1	22.32	1	62.17	2
29.49	1	76.51	1	24.45	1	62.43	1
30.50	1	78.43	2 +	24.75	2	63.01	2
31.43	2	79.56	2	25.45	2	64.00	1
31.86	4	80.65	5 r	26.56	1 +	64.58	3
34.47	1 +	82.00	1	27.02	1 +	65.35	1
34.67	1 +	86.80	2 +	28.00	1 +	65.95	1
35.00	1	87.40	1	28.21	3	66.29	1 +
35.09	1	87.92	3	28.79	1	67.78	1 +
35.65	3	88.49	2	29.08	1	68.22	2

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3668.66	1	3712.52	4	3757.00	1	3864.93	2
69.18	3	16.10	2	57.15	1	65.25	1
72.45	1 +	17.37	2	57.50	2	80.80	3
73.28	1	18.05	4 Tm?	59.25	1 +	83.04	2
74.23	1	18.75	1	59.66	1	84.26	1
75.32	2	19.46	4	60.10	1 +	85.52	1
76.65	3	21.65	2	60.48	1	87.50	3
77.37	1	23.78	2	61.50	8	88.21	4
78.15	1 +	24.18	1	62.09	6	89.11	1 -
78.71	1 +	24.55	3	65.18	1	89.92	3
79.03	2	25.06	3	66.31	3	90.77	4
80.21	1	25.20	3	67.91	2 +	91.05	1 -
82.84	4	26.90	1 +	68.91	2	91.20	3 -
83.61	1	27.05	1 +	70.38	1	92.45	1
84.16	3	27.39	1 +	71.26	3	92.87	5
84.44	4	28.12	1	72.60	2	94.62	1
85.02	1	28.95	1	75.01	1	94.76	1
87.23	1	29.69	10	75.80	3	94.97	1
89.25	3	30.20	1	77.24	1	95.46	1
89.77	1	31.41	5	77.76	2	95.94	2
90.45	1	31.91	2	78.44	2	96.40	15
90.82	1	32.33	1	78.80	2	97.35	1 -
91.25	1	32.65	1	79.09	1	98.66	2
92.85	20	32.89	1	81.19	4	99.16	2
94.40	4 Ad	33.69	1	86.31	1	3900.95	2
94.96	2	33.91	1	86.99	5	01.82	1
95.24	2	34.26	3 Tm?	88.04	6	02.95	10
96.40	4	34.65	5	92.00	4	04.01	1
97.07	3	35.83	1	92.98	2	04.15	2
97.39	1	38.34	8	93.10	2	04.70	3
97.82	3	40.41	3	94.53	2	05.24	1
98.33	1	41.23	4	94.96	1	05.59	3
99.07	1	42.00	1	95.18	1	06.47	20
3700.00	1	42.80	6	95.92	5	08.60	2
00.40	1 Tm?	44.21	3 Tm	97.25	5	09.72	1
00.89	4	45.11	2	98.36	1	09.98	1
01.52	3 Tm?	45.22	2	98.75	2 +	10.66	1
01.71	3	47.56	3	3803.25	2 +	11.70	2
01.99	1	48.78	1	10.50	4	12.06	2
02.65	1	49.15	1	10.89	5 +	12.57	2
03.41	1	50.30	1	20.57	4	15.00	1
05.01	1	50.71	3 +	28.20	2	15.84	2
05.79	1	51.95	1 Tm	30.69	10	16.13	1
06.67	2	52.12	1	33.19	2 +	16.60	2
07.78	4	52.34	1	35.78	1	18.18	2
10.40	1	54.42	1	44.40	2	18.48	2
10.92	1	55.06	1	48.17	3 Tm	18.67	2
11.95	2	56.19	3	56.51	1	19.76	1
12.17	1	56.51	2	60.10	2	22.05	4

1	3983.30	2	4031.85	1 +	4098.28	5
1	83.81	1	32.00	1 +	4100.77	8
1	84.36	1	36.24	2	01.25	1
1	86.80	1	37.82	2	03.47	2
1	87.12	1	38.20	1 +	03.97	3
10	87.79	4	38.55	1 +	04.11	2 +
1	88.14	3 Ad	39.76	1	06.01	5
8	88.66	1 +	40.61	1	06.76	2
10	89.55	1	40.95	2	08.72	2
2	91.34	2	43.15	4	09.24	1
1	93.80	1 +	45.58	3 Nh?	09.51	1
1	95.02	2	46.04	2	09.61	1
1	95.44	2	47.09	4	11.52	1
1	95.75	1	48.48	4	12.80	3
2	95.90	1	49.61	3	16.52	3
3	96.67	2	50.70	1	18.70	3
3	96.82	1	54.05	3	20.36	1
3	98.18	1 +	55.19	1	20.97	1
1 Tm	98.33	1 +	55.62	8	23.23	2
1	99.32	3	56.00	1	23.39	2
2	4000.61	3	56.10	1 +	24.94	1
3	01.73	1	57.97	1	25.78	1
1	03.02	1	59.64	2	26.35	1 +
3 Tm	04.21	2	59.98	10	27.26	2 Nh?
2	04.73	1	61.24	1	29.60	1 +
2	07.23	1	62.14	1 +	31.69	4
3	08.12	10	63.10	2	38.48	2
3	08.31	8	65.20	1	40.35	1 +
1	08.88	1 +	65.46	1	43.11	10
3	09.34	5	68.45	1	51.29	15
1	09.92	2	69.36	1 +	58.58	1 +
4	10.70	1	69.73	1 +	60.45	1 +
1	11.26	1	72.55	1	63.18	3
10	12.41	1	73.29	1	64.96	2
10	12.76	8	74.16	2	78.75	1
15	13.15	1	76.15	2	81.05	3 +
1	15.77	6	78.10	8	85.62	1 +
2	16.52	1	81.43	8	86.92	3 +
3	17.48	1	83.20	1	87.73	5
1 +	17.79	1	86.84	1	90.14	5
1	18.62	1	87.80	10	90.86	5
2	20.69	10	90.27	1 +	94.99	3 +
2	21.70	3	90.95	1 +	4200.08	2 +
2	22.16	3	91.95	1	00.80	1 +
1	22.95	1	93.05	2	03.89	5
1	24.53	1	94.36	5	05.45	1 +
1	25.68	1	94.81	3	11.89	4
1	26.57	1	96.97	1	18.24	1
4 r	27.20	1	97.03	1	18.59	8

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4221·17	3	4292·32	2 +	4347·76	2	4395·91
22·79	1	93·25	2 + br	48·49	3	96·60
23·88	3	95·20	2 + br	49·92	2	97·58
28·1	1 + br	96·30	1 +	50·90	2	98·17
28·80	1 +	96·88	1 +	51·36	1	98·95
29·35	1 +	97·50	1 +	51·84	3	4402·01
29·73	1 +	99·09	3	53·53	1 +	03·31
30·35	8	4300·63	1	53·90	1 +	04·04
32·20	1 +	01·39	1	54·61	1	07·30
32·60	1 +	01·78	8	55·55	1	09·50
33·30	1	03·36	1	56·86	2	11·50
34·20	1	03·96	5	57·57	2	11·95
34·56	1	05·30	1	58·35	1	12·90
34·92	3	05·62	1	58·61	1	13·90
35·35	2	06·04	1	59·22	2	14·50
37·20	2 +	06·51	2	59·40	1 +	16·59
38·56	1	08·80	2	60·09	3	17·02
40·10	2 +	10·62	2	60·54	2	18·87
42·32	8	11·95	1	61·82	2	19·78
43·95	1	13·54	1	62·40	2	20·73
44·75	1	13·84	1	62·90	1 +	21·89
46·57	1	15·92	3	63·81	1	22·67
49·69	1	16·55	2	64·44	1	24·70
52·11	6	17·86	2	64·80	1	25·98
53·70	2	20·12	5	66·84	1	26·93
54·48	2 +	21·55	1 +	67·91	2	28·55
55·20	1 +	22·77	2	68·50	1	28·86
55·60	1 +	23·20	1 +	69·54	3	30·02
56·43	1 +	24·32	1	71·40	1 +	31·55
59·52	1 +	27·45	1 +	71·65	1	32·39
63·80	2 +	28·99	2	72·02	1	32·80
65·00	3	29·98	1	72·99	1 +	34·76
69·70	1	30·43	3	73·50	2	36·49
70·10	2	31·50	2	74·05	1	37·50
72·15	2 +	32·17	1 +	74·42	1	37·82
72·65	2	33·17	1	77·40	1 +	38·90
75·31	2	33·90	2	77·98	1	39·15
76·61	4	34·60	1 +	78·50	3	39·80
76·83	2	35·16	2 +	80·85	1	40·68
78·03	1	39·13	3	81·28	1 +	41·38
79·16	1 +	39·50	1	82·33	3	42·99
79·67	1 +	39·79	1	84·86	8	44·35
81·00	3	41·09	3	85·51	1	44·79
81·52	2 +	41·60	1 +	86·59	5	45·55
84·68	1 +	44·30	1 +	88·52	4	45·91
85·8	2 + br	45·21	2	90·35	1	46·42
86·72	5	45·92	2	91·85	1	48·78
88·65	1	46·70	1 +	92·03	1	49·49
90·10	1	47·41	1	94·59	1	49·84

1	4507.60	1 +	4550.59	2	4584.50	1
1 +	08.21	1	51.02	1 +	87.08	2
2	08.48	1 +	51.48	1 +	88.32	1 +
2	09.36	1	52.30	5	89.12	1
3	09.63	1 +	53.28	2 +	89.50	3
1	10.2	1 + br	55.86	2	90.97	2 +
1	11.2	1 + br	57.10	2	93.10	2 +
1 +	11.95	1 +	57.51	1	94.18	2 +
3	12.33	2	58.53	1 +	94.82	1
1	12.70	1	59.23	1 +	96.90	2 +
1 +	13.30	2	60.50	1 +	98.28	2
1	14.90	2 +	61.32	2	98.83	1
1	16.69	2	62.01	1	99.21	1
1	17.05	1 +	63.45	10	4600.70	2
1	18.10	1 +	64.11	2	02.22	2
3 r	18.80	1 +	64.50	1	03.88	1
2	19.12	1 +	64.99	2	04.15	1
1	19.64	4	65.26	2	06.27	1
1	20.82	2	65.95	1 +	06.79	8
2 +	21.84	1	66.55	3	08.95	1 +
2 +	22.80	5 d?	67.10	1 +	11.43	5
3	24.20	1 +	67.30	1 +	14.66	1 +
1	24.35	1 +	68.06	1 +	16.10	4
3	24.90	1 +	69.00	3	18.50	1
2	25.85	1 +	69.47	1	20.6	1 + br
2	27.12	3	69.82	2	21.19	1 +
2	29.56	2	70.52	1 +	21.74	1 +
1 +	30.33	1 +	70.80	1 +	22.20	1 +
1 +	30.51	1 +	71.35	1 +	22.70	1 +
1	31.28	3	72.08	1 +	23.20	1 +
3 r	32.00	1 +	72.70	1 +	23.86	1 +
2	32.45	1 +	73.17	2	24.55	1 +
1	33.85	1	73.57	1 +	24.96	2
1	34.15	1 +	74.02	1 +	25.74	2
1	36.10	1	74.96	1 +	26.45	2
1	36.70	1 +	75.13	1 +	26.78	2 +
1 +	37.25	1 +	75.64	1 +	27.45	1 +
2	38.35	1 +	76.08	1	29.30	1 +
3	39.5	1 + br	76.49	1	29.53	1 +
1 +	40.40	2	76.85	1	30.65	1
8	41.40	1	77.15	1	31.10	10
1	41.81	1	77.46	1	31.78	1
1	42.36	1	78.00	2	32.55	1
4	43.20	1 +	78.15	2 +	34.47	2
2	44.15	1 +	80.24	1 +	35.04	1 +
1 +	45.00	2 +	80.77	1 +	36.96	1 +
1 +	46.45	1 +	81.24	1 +	37.56	1 +
1 +	47.85	1 +	81.89	2	38.02	1
1 + br	49.10	1	83.73	1	40.78	5

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Er

4642.36	1 +	4698.40	1 +	4758.22	1 +	4845.80
43.40	1	98.83	1 +	58.80	1 +	47.8
44.61	1 +	99.86	1 +	59.83	10	48.60
45.50	1 +	4700.94	1 +	61.19	2	49.01
49.25	1	02.34	3	62.80	5	51.80
50.10	2	03.17	1 +	64.83	1 +	53.29
50.50	1	04.69	1	70.45	1 +	54.59
51.00	1 +	05.97	1	74.28	1 +	57.60
51.61	1 +	07.79	1 +	74.80	1 +	58.62
52.17	2	08.84	1	77.70	1 +	60.12
52.62	1 +	09.17	1	78.73	2	61.77
53.49	2	09.95	2	79.60	2	63.80
55.25	1 +	11.72	1 +	81.52	1 +	66.55
56.86	3	12.23	1 +	82.03	1 +	69.53
57.20	1	13.23	2 +	83.18	1 +	70.62
60.15	1 +	14.60	1 +	83.69	1 +	72.28
61.37	2 +	15.22	3	83.99	1 +	72.69
61.60	2 +	16.13	1 +	86.85	1 +	75.58
62.70	1 +	17.48	1 +	91.88	1 +	78.50
62.85	1 +	18.88	3	92.75	1 +	79.43
63.42	1 +	19.42	1 +	93.96	1	80.07
64.45	1 +	22.22	2 +	95.69	5	81.2
65.60	5	22.91	4	4800.18	1	86.49
67.78	2	23.43	2	01.56	1 +	89.01
70.30	1 +	24.71	5	02.58	1 +	89.47
71.28	1 +	26.30	2	06.17	1 +	90.30
71.77	2	26.50	1 +	08.91	1 +	96.55
73.32	3	29.21	4	10.75	1 +	97.13
74.38	1 +	30.99	1	11.60	1 +	98.32
74.80	1 +	31.80	8	14.26	1 +	4900.26
75.77	10	32.40	1 +	14.99	1 +	01.82
76.71	1 +	33.01	1 +	15.70	1 +	03.81
77.29	1	33.52	2	16.81	1	04.61
79.24	8	34.20	1 +	17.95	1	05.44
80.2	1 + br	35.58	1 +	20.52	8	06.10
81.68	1	37.16	5	20.92	2 +	07.25
82.13	1 +	39.20	1 +	23.73	1	09.46
84.79	3	40.48	1 +	24.75	2	12.28
85.90	1 +	42.18	2	25.36	2	17.00
86.60	1 +	44.30	1	26.27	1 +	17.25
87.20	1	45.43	2	28.24	2	22.35
88.77	3	47.29	2	28.85	2	22.80
90.65	1 +	50.07	1 +	29.71	2	25.25
94.25	1	50.92	1 +	31.34	5	25.60
94.75	1 +	51.25	1 +	34.94	3	27.16
95.22	1 +	51.71	8	36.40	1	27.52
96.50	1 +	54.79	3	40.60	1 +	29.05
96.78	1 +	55.45	1 +	42.21	2	31.97
97.33	8	57.30	1 +	43.13	1	32.30

0	2	5036.11	2	5226.27	1 +	5380.52	1 +
0	1 +	42.23	4	29.51	1	82.34	1 +
7	1 +	44.05	1	46.30	2	84.3	1 + br
5	1 +	45.05	2	47.15	1 +	85.10	1 +
5	1 +	45.49	1 +	47.95	1 +	85.80	1 +
0	1 +	46.17	2	48.90	1 +	86.40	1 +
2	3	52.87	1	56.11	5	88.90	1 +
0	1 +	56.34	1 +	57.20	2 +	96.05	2
7	1 +	58.90	1 +	64.93	2 + br	97.30	1 +
0	1 +	60.02	1 +	69.20	2	5403.90	1 +
5	1 +	60.60	1 +	73.07	2	04.30	1 +
9	1	61.13	1 +	76.15	1 +	05.95	1 +
8	1	61.80	1 +	77.82	1 +	14.85	4
0	4	63.42	1 +	79.05	1 +	18.25	1 +
5	2	63.55	1 +	79.45	2 +	20.05	2 +
1	2	66.08	1	82.80	1 +	22.99	2
5	1 +	66.93	1 +	86.15	1 +	27.73	1 +
5	1 +	70.22	1	87.60	1 +	29.85	2
5	1 +	70.53	2	89.90	1 +	32.65	1 +
0	1 +	72.65	1	98.8	1 + br	33.53	1 +
3	2	73.05	1	5302.50	2	34.00	1 +
5	2	77.80	3	04.70	1 +	34.35	1 +
3	1 +	82.01	1 +	06.02	1 +	34.74	1 +
3	1 +	92.40	2 +	07.30	3	35.6	1 + br
3	3	5103.50	1	15.40	1 +	37.07	1 +
0	1 +	13.31	2	16.7	1 + br	38.99	1 +
5	1 +	19.82	2	17.8	1 + br	40.00	1 +
5	1 +	24.75	1	19.10	2	45.85	1 +
9	1 +	27.60	3	23.17	1 +	47.10	1 +
0	1	31.72	2	24.33	1 +	48.42	1 +
5	1 +	33.20	2	25.15	1 +	54.45	3
5	2	33.99	3	28.24	2	56.78	5
9	1 +	34.38	1	29.25	1 +	58.59	2
7	2	43.79	2	30.87	1 +	62.65	3
5	1 +	44.29	2	33.27	2 +	64.45	1
0	1 +	60.56	2 +	33.50	1 +	68.54	4
1	3	64.00	2	34.40	2	69.84	2
4	3	65.01	3	37.33	1 +	75.40	2 +
4	1	79.68	1	39.50	1 +	77.68	2
5	1 +	81.16	1	44.10	2	86.16	3
1	1 + br	89.09	4	44.67	2	91.90	2
3	1 +	91.82	1 +	46.63	1	5503.98	2
6	2	5206.71	2	48.21	3	05.88	1 +
3	1 +	10.53	1 +	50.63	2	13.60	1 +
3	2	11.40	1	52.40	1 +	14.90	2 +
3	3	13.13	2	69.03	2 +	16.22	2 +
3	1 +	14.60	1 +	71.68	2 +	18.31	2 +
5	1 +	15.29	1 +	73.18	1 +	18.94	2 +
9	1	18.40	2	77.00	1 +	20.20	1 +

5529.95	1+	5800.99	3	5990.14	1	6269.09	1
40.80	1+	06.33	1	6007.04	2	71.85	1+
53.30	2+	06.70	1+	08.13	1	75.19	2
56.75	2+	12.30	1	08.98	1	81.62	1+
63.30	2+	13.15	1+	15.06	2	87.11	2
93.61	3	14.48	1+	15.99	2	88.84	1+
5601.40	2+	27.01	10	22.80	3	92.03	1+
03.00	1+	32.17	1+	32.40	1	99.67	3
07.52	1+	32.82	1+	39.9	1+ br	6309.01	5
12.00	2	34.16	1	45.87	1	26.36	3
22.21	2+	36.04	2	47.54	1+	40.9	1+ br
26.75	3	38.98	1+	47.85	1+	47.43	2
31.61	3	40.14	1+	48.42	1	51.80	1+
32.75	1	41.39	1+	53.05	1	62.00	1+
36.40	1+	42.89	1	55.08	2	66.79	1+
40.52	3	44.30	1+	55.49	1+	80.93	1+
58.72	2+	50.29	3	61.51	1	84.25	1+
65.18	2	55.53	3	67.74	1	88.39	3
65.67	2	57.16	1	76.69	3	98.32	1+
76.02	3	57.70	1	79.92	1	6413.84	1
84.97	1+	60.94	1+	98.20	1	23.35	1+
95.05	1+	71.90	1	6105.42	2	32.73	1+
95.75	1+	72.62	3	08.60	1	39.29	1
99.20	1+	73.77	1	15.63	1+	41.56	2
5711.09	2	81.40	3	16.24	1	54.26	1+
17.70	2	86.57	2	25.53	2	60.48	1
19.76	2	5902.32	2	27.10	1+	82.00	1+
27.19	2	06.30	2	49.54	1	92.58	3
33.65	1	09.46	2	70.29	2	6520.77	1
36.76	1+	16.70	1	73.45	1+	41.80	1+
37.15	1+	33.80	1	83.42	1+	56.61	1+
39.40	3	37.45	1	96.15	1+	58.05	1+
40.81	2	46.64	1	6204.77	1+	83.72	3
48.88	2	47.95	1+	09.44	1	93.8	1+ br
52.75	2	55.71	1	21.22	10	6601.36	3
57.85	3	56.33	1	22.09	1+	05.20	1+
63.03	5	57.54	1	31.10	2	16.99	1+
64.04	1	59.19	1	44.9	1+ br	6722.14	1
70.15	3	68.95	2	49.15	1+	23.00	1
83.06	3	71.16	1+	55.3	1+ br	60.13	1
84.89	2	71.54	1+	59.35	1	6848.40	1
88.89	1+	75.74	1	62.79	3	65.4	1+
91.40	1	83.20	1+	68.17	1	6972.00	1

Kanten.

Kontinuierlicher Hintergrund von 5350 bis 5600 mit einem Maximum bei 5430.

XXIII. Eu. Europium.

Ältere Messungen: F. Exner und E. Haschek, Wiener Ber. CXI (1902).

Material: Europiumnitrat aus Oxid von E. Demarcay, auf Gaskohle.

Verunreinigungen: Ba, Ca, Sa.

Linienzahl: 857.

2373.00	1 +	2743.38	2	2947.44	2	3247.45	1 +
75.50	1	44.36	2	49.26	1	62.64	1
79.76	1	45.70	2	50.94	1	66.54	2
2421.64	1 +	47.38	1	52.79	3	72.91	2
52.20	1 Eu?	47.94	2	59.03	2	77.89	2
55.03	1	52.29	2	59.59	2	3302.10	2
60.55	1 +	73.01	1	60.34	3	04.35	1 +
61.84	1	76.65	1	91.46	3	04.65	1
71.23	1	80.64	1	95.33	1	08.15	2
90.77	1 Eu?	82.02	3	3001.48	1	13.46	2
2559.30	1	2802.10	1 Eu?	06.39	2	20.03	1
64.27	1	10.81	1	22.27	1	22.01	2
68.26	1	11.86	3	40.89	1	22.42	3
77.25	2	13.18	2	55.07	4	34.48	6
77.69	1 +	14.08	5	59.12	2	38.84	1
2604.68	1	16.30	3	67.09	2	50.57	3
35.56	1	20.90	4	67.81	1	51.35	1 +
38.84	4	27.36	1	67.88	1	51.70	1
41.37	3	28.81	4	69.23	1	53.85	2
53.69	1	29.40	2	76.20	1	54.54	1
58.51	1 +	33.20	1 Pb?	77.50	3	69.22	3
59.50	1	33.36	2	85.83	1	80.40	1
68.40	4	44.05	1	89.44	2	90.94	1
70.93	1 +	59.79	3	97.60	3	92.14	2
73.54	2	62.69	3	98.30	1	94.23	1
78.36	3	64.52	1	3106.31	3	96.73	4
82.72	1	71.69	1	11.55	6	3419.96	1
85.74	3	76.16	1	17.72	1	21.82	1
92.10	3	77.88	1	25.23	1	23.22	1
2701.21	3	78.97	2	30.83	2	25.19	3
01.99	4	87.01	1	32.27	2	26.60	1
05.36	2	87.97	1	37.06	1 +	32.69	2
10.09	2 +	92.65	3	50.00	2	35.34	2
17.06	3	93.16	3	68.40	2	35.85	1
24.04	2	93.95	3	73.75	2	41.15	3
27.87	4	2904.31	1	85.69	1	45.32	1
29.46	5	06.82	5	3210.65	4	53.62	1
31.45	1	09.10	3	12.89	5	54.00	1
32.68	1	12.43	1	13.84	3	54.25	1
35.33	1	17.54	1	35.26	2	57.17	3
38.66	1	25.19	4	41.55	3	57.70	1
40.71	2	32.65	1 + br	46.14	2	61.52	3

3468.02	4 Eu?	3683.63	1 Pb?	3901.07	1	3988.36	1
76.77	1	84.86	1+	03.39	3	92.50	1
77.17	2+	86.20	1+	07.28	30	94.05	1
81.77	1+	87.90	1	10.03	1	96.11	1
85.56	1	88.57	20	10.26	1+	4000.87	1
88.45	1	89.12	1	11.16	1+	00.95	1
3502.96	1+	92.25	1+	14.30	1	03.10	1
03.42	1+	3708.6	1+	15.35	1	03.88	1
05.45	1	11.02	2	15.75	2	10.57	2
08.99	1	13.58	2	16.11	3	11.85	3
11.20	3	15.05	2	16.93	2	12.95	1
21.26	4	17.03	2	17.43	4	14.52	2
22.52	1	19.30	3	17.81	1	14.78	1
23.63	1	21.4	1+	18.61	2	16.82	3
31.25	2	22.77	2	19.19	1	17.75	4
32.36	1	25.10	30	27.60	1	25.60	1
38.26	1	25.93	1	29.02	2	26.10	2
40.0	1+	28.34	2	30.00	2	26.77	2
42.31	3	29.85	2	30.66	50	28.76	2
44.03	1	31.33	1	36.12	1	30.17	2
44.30	1	32.34	3	36.79	1	30.84	4
52.65	3	35.8	1+	40.55	1	33.85	1
62.33	1	38.23	1	41.72	1	36.25	2+
72.75	2	41.46	4	42.34	1	36.69	1+
89.39	3	43.71	2	42.47	1	37.84	1+
91.47	2	44.35	2	43.21	2	38.53	1+
3603.40	3	60.95	1+d	45.82	1	39.36	5
05.77	1+	61.30	3	49.72	3	40.65	2+
06.86	2	62.50	1+	54.40	1+	42.18	1
08.88	1	64.50	1	55.86	4	47.87	1+
11.52	1	66.06	2	58.04	1	53.27	1
11.75	2	68.35	1	61.27	1+	58.00	1Pb?
16.30	1	70.40	1	63.75	1+	58.64	1
18.34	2	72.30	1	64.61	2+	59.19	1
19.97	1+	74.26	4	65.06	4	59.55	1
22.70	1+	99.16	3	67.27	2+	60.20	1+
29.94	1	3811.47	4	69.36	2	60.45	1+
32.32	2	19.80	50 u	72.16	50	61.73	1+
46.85	1+	65.69	4	74.03	1	62.33	1+
56.40	2	84.91	5	77.01	2	65.57	2
60.78	1	91.66	1+	78.60	4	69.12	2
62.6	1+	94.86	1	79.15	1+	71.40	3
63.10	1	96.96	1+	79.78	1	78.39	3
63.62	1	97.85	2	83.20	1+	80.63	1
74.87	1	98.35	1	85.39	1	85.52	3
78.41	1	98.65	1	86.27	1	88.00	1+
79.63	1	98.90	2	86.79	3	96.96	2
82.58	2	3900.36	1	87.25	1+	4102.86	2
83.41	1	00.66	3	88.00	2+	04.04	2

91	4	4270.67	1	4357.92	1	4485.32	3	
92	1	+ -	76.05	1	61.73	1	88.46	2
93	3		76.35	2	68.59	1	95.20	1
94	1		79.40	1	+ -	69.67	2	4502.30
95	1		79.80	1	+ -	70.60	2	+ -
96	1		82.09	1		72.38	2	04.67
97	4		84.83	1		75.29	1	11.73
98	1		85.86	1		76.59	1	12.33
99	0	100	87.60	1		78.42	1	12.80
100	4	+ -	93.15	1	+ - br	80.00	1	13.40
101	1		94.04	1		81.17	1	14.90
102	4	+ -	96.93	1		82.24	1	16.71
103	0	+ -	97.60	1	+ -	83.31	3	17.52
104	4	+ -	98.88	5		88.09	3	21.13
105	0	1	4301.00	1		89.30	1	+ -
106	9	2	04.55	1	+ -	90.58	1	22.76
107	5	+ -	04.70	1	+ -	91.55	1	26.84
108	3	2	05.60	1	+ -	97.89	1	34.92
109	5	2	06.07	1	+ -	99.51	1	35.73
110	0	1	06.57	1	+ -	4403.34	1	36.25
111	8	2	07.00	1	+ -	05.44	2	38.26
112	6	1	10.75	1	+ -	07.25	1	39.48
113	5	2	11.20	1	+ -	09.30	1	49.68
114	6	2	11.45	1	+ -	12.20	1	52.40
115	2	4	13.62	1		13.72	1	53.30
116	2	+ - br	14.00	1		14.80	1	55.78
117	0	1	17.84	1		17.42	2	65.10
118	0	3	+ -	20.30	1	+ -	19.83	1
119	0	100	22.74	2		26.60	1	76.50
120	4	1	29.56	3		29.93	1	77.12
121	5	1	30.17	3		33.41	1	78.73
122	3	1	30.79	3		35.01	4	81.55
123	3	1	31.36	2		35.75	50	85.90
124	0	1	32.60	1	+ -	36.40	2	86.05
125	1	1	34.91	1		38.12	1	86.52
126	3	1	35.62	1		41.65	1	91.25
127	3	1	37.83	3		45.33	1	94.27
128	0	2	40.08	1	+ -	49.03	1	97.51
129	1	+ -	40.67	1	+ -	51.77	1	4611.68
130	6	+ - br	40.85	1	+ -	56.06	2	14.79
131	7	1	43.45	1		64.00	1	16.68
132	0	1	46.07	2		64.75	1	25.50
133	0	1	49.90	1	+ -	65.13	3	27.47
134	3	2	50.20	1	+ -	66.18	1	30.02
135	1		51.45	1		71.81	1	41.60
136	3	1	52.41	1		72.15	1	44.44
137	1	+ -	53.64	1		77.33	1	50.68
138	1		54.95	2		80.27	1	51.74
139	1		55.26	5		84.85	1	56.90

4658.80	1	4823.70	1	5077.54	1	5304.05	2
60.55	2	24.44	1 +	78.20	1 +	22.99	2
62.10	50	25.80	2 + d	85.80	1	50.60	1 +
65.24	1	29.48	2	89.25	2	51.87	2
69.53	1	30.03	1 +	92.86	2	53.04	1
69.81	1	30.50	3	96.60	2	55.27	2
71.33	1	39.10	1 +	98.89	2	57.79	2
75.62	1	40.61	2	5114.50	3	61.02	8
81.25	1 +	41.74	1	24.92	2	61.80	3
81.70	1	43.50	1	29.23	3	77.13	3
85.42	2	44.45	1	30.25	1	81.46	1
88.41	3	49.85	3	33.68	4	93.14	2
88.69	1 +	51.40	1 +	41.20	1 + br	5402.99	10
92.80	1	61.05	1 +	47.98	1 +	05.54	1
95.52	1	63.23	1 +	51.00	1 +	12.05	2
98.31	3	66.58	1 +	55.60	1 +	21.25	2
4704.62	1 +	67.79	4	60.23	4	27.14	3
09.95	1 +	79.35	1 +	66.89	3	43.78	2
12.29	1 +	79.65	1 +	78.17	1 +	51.74	10
13.77	3	84.23	3	78.85	1 +	53.17	10
17.40	2	94.85	3	93.89	1	72.50	4
18.79	2	4901.02	5	5200.00	3	88.86	5
24.15	1 + d	07.38	8	01.10	2	95.40	3
25.87	1	11.61	8	06.60	1	5501.10	1 +
28.35	1	17.69	1	08.03	1 +	10.73	5
36.82	1 +	22.42	1	13.51	2	26.83	2
39.36	1	24.89	2	15.25	4	33.45	1
40.70	2	28.19	2	17.16	1	42.77	2
56.14	2	33.01	2	23.64	3	47.66	10
58.90	1 +	38.47	2	34.10	1	70.52	10
63.10	1	47.52	2	36.28	1	77.33	10
64.15	2	50.30	1	39.41	1	79.82	3
70.98	3	53.68	3	42.86	1 +	80.26	4
77.87	2	60.37	3	48.85	1 +	86.46	3
78.84	2	62.71	3	49.34	1 +	88.98	10(Ca)
81.49	2	68.89	2	56.28	1 +	92.48	1
84.20	2	75.90	2	59.93	1	5600.01	1
92.75	3	76.59	1	66.57	3	06.09	1
98.26	2 +	84.10	1 +	72.13	4	19.01	2
99.10	1	86.90	1	72.63	1 +	22.66	3
99.59	1	95.74	1	83.00	3	32.77	3
4801.00	1 + br	5013.32	5	85.85	1 +	45.98	5
04.26	3	23.09	5	87.45	1 +	74.06	2
09.47	3	29.72	4	89.45	1	81.33	1
13.72	1 +	33.71	3 +	91.48	1	84.48	1
14.70	1 +	56.17	1 +	92.85	1	88.6	1 + br
15.98	1 +	57.66	1 +	93.88	1 +	5731.06	2
20.05	1 +	63.90	1	94.83	2 +	39.19	2
20.63	2 +	68.10	2	98.30	1	65.40	5

3.91	3	5964.00	2	6108.37	2	6382.95	3
2.97	1 +	66.30	5	18.98	3	84.09	4
0.48	3	67.30	8	24.85	2	6401.15	5
5.90	1 +	68.7	1 + br	73.23	10	06.35	2
8.94	4	71.94	1	78.93	3	10.27	8
0.2	1 + br	73.00	4	88.32	10	11.54	4
1.15	1 +	80.75	1 +	95.25	4	28.52	2
1.21	10	83.43	1 +	6207.80	1 +	37.83	10
5.99	1 +	84.10	1 +	09.55	1 +	38.14	2 +
7.20	1	93.09	4	30.75	1 +	40.18	1 +
1.20	1	6003.3	1 + br	33.94	2	58.17	4
6.03	1 +	04.60	2	50.71	2 +	70.97	1
3.97	1 +	05.9	1 + br	62.47	10	83.29	1
3.23	3	12.43	2 +	67.18	2	6501.79	2
5.1	1 + br	12.80	3	86.19	1 +	19.81	3
1.5	1 + br	15.81	2	89.18	1 +	22.96	1 +
5.55	1 +	18.39	8	91.55	3	49.3	1 + br
2.98	1	23.36	2	6300.00	5	68.16	2
0.20	1 +	29.20	3	03.64	8	94.09	2
3.02	3	44.87	2	14.03	1 +	6603.85	1 + br
5.52	1 +	49.77	8	18.83	1 +	45.44	20
3.79	1	57.55	3	24.70	1 +	94.19	2
2.96	1	75.80	2	36.01	4	6745.18	1 +
3.74	1	77.63	1 +	50.22	5	6802.98	2
4.10	1	84.09	5	56.03	3	64.81	3
4.54	1	99.59	5	69.49	3	7077.40	1

XXIV. Fe. Eisen.

Die Messungen: H. Kayser und C. Runge, Berl. Akad. (1888).

N. Lockyer, Phil. Trans. 185 (1894). E. A. Kochen, Ztsch. für
wiss. Phot. 5 (1907) (Rot).

Material: Metall von Prof. H. Weidel.

Unreinigungen: Cu, Mn.

Atomzahl: 2392.

Alle mit R bezeichneten Zahlen sind von Rowland übernommen und
als Standards benutzt. Ausser diesen wurden auch eigene Standards
dient.

7.84	1	2265.17	1	2272.95	1	2287.32	1
0.17	1	67.01	1	74.22	1	87.70	1
3.23	1	67.20	1	76.14	1	89.10	1
5.99	1	67.56	1	77.20	1	90.63	1
9.61	1	67.65	1	80.03	1	91.21	1
0.20	1	71.92	1	80.31	1	92.64	1
4.52	1	72.20	1	84.17	1	93.97	1

2294.54	1	2385.07	1	2463.40	1	2502.59	1
97.00	1	88.71	2 R.	63.82	1	03.60	1
97.85	1	90.05	1	65.25	2	05.10	1
98.25	1 R	91.57	1	66.81	2 u	05.56	1
99.33	1	95.50	1	67.80	1	05.74	1
2300.26	1	95.72	3 R	68.97	2	06.66	1
01.76	1	99.33	2 R	71.06	1	07.49	1
03.55	1	2402.67	1	72.45	1	07.98	1
03.65	1	04.50	1	72.97	1 R	10.92	3 +
09.10	1	04.97	2 R	73.15	3 u	11.45	1
13.20	1	06.74	2 R	74.90	2	11.85	1
20.47	1	07.69	1	76.10	1 +	12.42	2
27.47	2	08.10	1	76.53	1	13.5	1 + - br
31.40	2	10.60	2 R	76.75	1	13.95	1
32.89	2	11.15	2	79.58	1	14.79	1
38.08	2	13.41	1	79.87	3 u	15.96	1
39.7	1 + br	24.24	1	80.27	1	16.63	1
40.35	1 + br	29.57	1	82.22	1	17.20	1
43.57	2 R.	31.12	1	83.36	8 u, R.	17.75	1
44.15	1	35.96	1 +	83.61	2 +	18.20	3 +
44.36	2	36.43	1	84.29	3 +	18.91	1
45.15	1 +	38.26	1	86.06	1	19.70	1
45.45	1 +	39.36	1	86.45	1	21.10	1 +
48.20	2	39.82	2	86.77	1	22.01	1
48.38	2	40.21	1	87.15	1	22.60	1
51.28	1	41.74	1	87.46	1	22.94	10 u
54.96	1	42.67	2	88.24	10 u	23.20	1
59.18	2	43.96	1	89.05	2	23.74	2
60.08	2	44.60	1	89.89	3 +	24.40	2 +
60.38	2	45.29	1	90.72	5 u	25.13	1
62.10	1	45.62	1	91.24	3 u	25.49	1
64.90	2 R	47.80	1	91.51	2 +	26.35	1
66.66	1	50.55	1	92.08	1	27.58	5 u
68.66	1	51.50	1	92.26	1	28.97	1
69.52	1	51.83	1	92.45	1 +	29.20	1
70.57	1	52.26	1	92.73	1	29.36	1
71.49	1	52.68	1	93.34	2	29.63	1
73.81	2	53.57	1	94.09	1	29.93	1
74.61	1	55.65	1 +	94.34	1	30.79	1
75.26	1	56.2	1 + br	95.97	1	32.42	1 +
77.31	1	57.68	2 R	96.14	1 +	32.96	1
78.00	1 +	58.65	1	96.63	1	33.24	1
79.34	1	58.86	1	97.09	1	33.74	1
80.85	1	60.40	1	97.85	1 +	33.90	2
81.97	1 +	61.21	1	98.34	1 +	34.51	1
82.12	3 R	61.39	1 +	98.99	1	35.23	1
83.15	1	61.99	1	2501.23	3 u	35.69	3 +
83.34	1	62.30	1	01.57	1	36.85	2
84.47	1	62.75	3	01.80	1	37.26	3

2538.91	1	2585.97	3	2645.53	1	2711.75	3
39.05	1	88.10	2	47.66	1	14.14	1
39.42	1	91.35	1	51.81	1	14.49	3
40.75	1 +	91.64	2	56.24	1	14.95	1
41.07	2 +	92.37	1	56.87	1	15.40	1
41.91	1	93.61	1	61.4	1 + br	16.30	1
42.20	2	94.14	1	62.15	1	16.47	1
43.46	1	94.21	1	62.41	1	17.44	1
44.01	2	98.46	3	64.2	1 + br	17.85	1
44.81	2	98.94	1 +	64.77	1	18.51	2
46.1	2 +	99.49	3 R	66.51	1	19.11	8 u
46.98	2	99.62	2	66.91	2	19.48	1
48.15	1 +	2600.27	1 +	67.04	2	20.28	1
49.70	3 +	03.69	1 +	68.01	1	20.65	1
51.20	2	04.86	1	69.58	1	20.99	6 R
52.69	1	04.94	1	73.33	1	22.13	1
52.92	1	06.40	1	75.40	1	23.67	5 R
53.27	1	06.92	2	79.15	3 R	24.88	1
55.31	1 +	07.17	3	80.26	1	25.03	3
56.36	1	08.65	1 +	80.56	1	25.38	1
56.96	1	09.27	1	81.70	1	25.67	1
58.60	1	10.83	1	82.31	1	26.14	2
60.66	1	11.14	1	84.12	2 +	26.30	2
61.35	1	11.98	4	84.92	1 +	27.64	3
61.79	1	12.85	1	87.90	1 +	28.10	2
61.95	1	13.31	1	89.30	2	28.90	1
62.32	1	13.91	3	89.55	1	29.00	1 +
62.64	3	14.57	1	89.93	1	30.84	1
63.56	3	15.50	1	90.17	1	31.06	1
64.65	1	17.21	1	92.35	1	33.67	4 R
67.01	1	17.71	3	92.76	1	34.09	1
67.96	1 +	18.11	1	92.92	1	34.34	1
68.95	1	18.79	1	94.65	2	34.67	1
69.70	1	18.87	1	95.15	1	35.59	5
69.82	1	20.50	1	95.70	2 + d	37.04	2
70.64	1	21.77	3	96.08	2	37.40	2
72.84	1	23.45	1	96.40	2	37.89	1
74.46	1	23.63	2	97.11	1	38.27	1
75.85	2	25.76	3	98.25	1	38.50	1
76.77	2	28.39	3	99.19	2	39.62	5
78.02	2	29.66	1	2702.00	1	41.19	1
79.37	1	31.12	3	02.55	1 +	41.68	1
79.95	1	31.42	3	04.06	1	42.10	1
80.17	1 +	32.34	1	06.13	3	42.49	10 R
80.58	1 +	32.67	1	06.66	3	43.26	2
81.56	1	35.89	2	07.54	1	43.63	2
82.41	2	36.55	1	08.65	2	44.17	2
82.70	2	41.75	1	10.09	1	44.62	2
84.63	2	44.10	2	10.62	2	45.14	1

2746.58	3	2778.94	1	2832.55	3 R	2880.87	1
47.09	3	79.40	1	33.16	1	83.85	1
47.64	1	80.83	1	33.50	1	86.45	1
49.28	1	81.95	2	33.93	1	87.93	1
49.43	2	83.81	1	34.85	1	88.07	1
49.57	1	84.15	1	35.56	2	90.05	1
50.24	3 R	84.47	1	36.05	1	90.13	1
50.80	1	86.91	1	38.23	3	91.01	1
51.01	1	88.06	2	38.54	1	91.82	1
51.45	1	88.20	4 R	40.09	1	92.04	1
51.93	1	89.56	1	40.55	2	92.64	1
53.21	1	89.92	1	41.04	1	93.90	1
53.40	1	91.56	1	43.02	1	94.00	1
53.80	2	91.90	1	43.33	1	94.63	3
54.15	2	92.51	1	43.74	3	95.15	3
54.52	2	94.82	1	44.09	4	98.46	1
55.04	1	95.11	1	45.68	3	99.54	3
55.28	1	95.64	2Mg?	46.92	1	2901.51	2
55.85	4	96.98	1	48.80	2	02.05	2
56.40	4	97.88	3	51.64	1	04.26	1
57.42	3	99.24	1	51.90	3	06.54	1
57.96	1	2803.25	1	53.81	1 d	07.64	2
59.91	2	03.71	1	57.90	1 +	08.98	1
61.00	1	04.64	3	58.11	1 +	09.62	1
61.89	3	04.95	1	59.00	2	11.06	1
62.16	3	06.18	1	62.61	1	12.30	4
62.89	1	07.10	3	63.45	1	14.40	1
63.24	2	07.32	1 +	63.54	2	18.13	3
64.46	2	08.43	1	63.97	2	18.45	1
66.79	1	10.4	1 +	66.74	2	19.95	1
67.04	2	12.17	1	67.39	1	20.80	2
67.64	3	13.42	4	67.65	1	22.50	1
68.23	1	15.15	1	67.96	1	22.75	1
68.55	1	15.62	1	68.30	1	23.41	2
69.06	1	17.60	1	68.54	1	23.55	2 +
69.44	2	19.40	1	69.01	1	23.96	2
69.78	1	20.91	1	69.40	3	24.05	1 +
70.82	1	23.40	4	69.94	1	25.47	1
72.21	3	24.46	1	72.45	3	26.00	1
72.44	1	24.78	1	73.65	1 +	26.69	2
72.65	1	25.66	2	73.72	1 +	27.65	1
72.97	1	25.77	2	74.27	3	28.22	1
73.36	1	26.09	1	74.98	1	28.85	1
74.84	2	26.58	1	75.40	2	29.19	10
75.06	1 +	27.80	1	76.80	1	29.70	1
75.94	1 +	27.98	1	77.40	3	31.52	1
76.55	1 +	28.90	2	78.83	1 d	36.68	1 +
78.20	1	31.05	1	79.00	1	36.53	1 +
78.34	2	31.67	2	80.69	1	37.02	10

2937.91	4	2976.65	1	3025.96	5 R	3080.22	1
39.15	1	77.00	1	26.59	4	83.86	6
40.70	1 +	79.46	1	29.33	1	90.34	1
41.46	4	80.65	2	30.28	4	91.23	1
43.72	1 +	81.59	3	31.31	4	91.70	5
44.50	1	82.00	2	31.77	4	93.45	1 R
45.16	1	83.70	15 u	33.22	1	93.94	2 d
47.46	1	84.93	2	34.22	2	94.99	1
47.76	1	85.65	1	34.62	1 +	95.36	1
47.99	10	86.55	1	35.83	1 +	97.00	1
48.55	2	86.74	1 +	37.51	8 R	98.30	2 R
48.80	1	87.40	3	37.86	1	3100.07	5
49.02	1	87.69	1	39.40	1	00.44	3
49.30	1	88.55	1	40.55	3	00.80	3
50.37	5	90.50	2	41.77	1	01.13	1
51.46	1	91.76	2	41.86	2	01.69	1 Ni?
51.66	1	94.54	15 u	42.15	2	02.85	1
53.60	2	96.50	2	42.77	4 R	03.00	1
53.91	1	99.34	1	45.18	2 R	03.94	1 +
54.05	5	99.63	5	45.68	1	08.10	1 +
54.75	2	3000.55	3	47.05	1 +	10.40	1
56.80	1	00.97	2	47.15	1 +	10.99	1
56.97	1	01.08	4	47.72	20 u, R	11.86	1 +
57.50	5	02.75	1	48.55	1 +	11.95	1 +
59.46	1	93.14	3	49.45	1 +	12.20	1
59.80	1	04.22	1	53.17	2 R	13.71	1
60.13	2	04.74	1	53.56	1 +	16.35	1
60.42	1	05.42	1	55.37	3 R	16.71	4
60.68	1	07.25	3	55.83	1 +	17.74	1
60.77	1	07.39	3	56.35	1 +	19.59	2
61.31	1	08.24	5	57.56	15	20.54	2 R
62.24	1	09.20	2	58.59	1	20.99	1
64.33	1 +	09.70	5	59.20	15	21.90	1
64.75	1	11.61	2	60.68	1	22.42	1
65.16	1 +	12.01	1	61.10	1	23.45	1
65.40	4	12.57	1	64.07	1	24.99	1
65.95	1	14.27	1	66.61	1 R	25.79	5
66.36	1	16.04	1	67.34	15	26.26	2 Cu?
67.02	15 u	16.30	4	68.08	1	26.85	1 +
68.59	1	17.73	3	68.29	2	28.96	1
69.49	2	18.22	1	69.57	1	29.19	1
69.62	3	19.10	3	74.12	1	29.43	2 R
70.24	5	19.40	1	74.30	1	32.64	1
70.65	1	20.55	1	74.59	1	34.21	3
72.40	1	20.75	20 u	75.88	8	35.55	1 +
73.25	3	21.19	20 u	77.27	1	35.70	1 +
73.35	10 u	24.15	4	78.14	1	35.95	1 +
74.92	1 +	25.39	1	78.55	1 R	36.59	1
76.24	2	25.72	3	80.13	1	38.60	1

3139.84	1	3188.93	3	3248.33	3	3324.67	1
40.02	1	91.77	4	49.31	1	25.59	1
40.50	2 R	92.91	3	50.77	1	28.97	2
42.59	2	93.37	5 d	51.38	2 R	31.74	1 R
43.01	2	94.53	1	52.58	1	31.89	1
43.35	1	96.22	1 R	53.06	1	34.33	1
44.10	3	97.06	5	53.74	1	35.87	1
44.62	2 R	99.63	4	54.50	2	36.36	1 +
45.18	1	3200.59	4	57.35	1	37.78	2
47.40	1	00.90	1	57.74	2	38.77	1 +
47.74	1	02.69	1	60.14	1	39.30	1
47.90	1	05.51	4 R	60.42	1	40.70	2
48.50	1	07.21	1	62.17	1	42.05	1
50.43	1	08.60	1	62.46	2	42.37	1
51.47	3 R	09.45	2	63.51	1	42.44	1
53.34	3	10.36	3	64.65	2	48.07	2 R
54.60	1	10.97	3	65.17	2	51.68	1
55.40	1	11.64	1	65.75	4	51.92	1
56.39	2	11.81	2	68.36	1	54.22	1
57.16	3	12.11	4	71.14	4	55.38	2
58.01	3	13.47	1	71.60	1	56.55	1 R
60.78	3	14.18	5	71.81	1	59.63	1
61.49	1	14.53	2	74.56	1	66.94	1
62.07	2 R	16.07	4	76.59	1	67.02	1
62.46	1	17.51	3 R	77.50	1	69.70	3
65.13	1	19.71	4	78.84	1	70.96	4
65.98	2	19.93	4	80.40	2	72.23	1
66.55	2	22.21	10	83.04	1	78.81	2
68.04	1	25.92	10	84.73	2	79.15	2
68.99	1	27.19	1	85.55	1	80.26	3 R
71.47	1 R	27.91	4	86.90	8	82.56	1
71.78	1	28.36	2	89.09	1	83.83	2
72.19	1	29.05	1	91.15	2	84.14	3
73.80	1 +	29.24	2	92.16	2	87.55	1
75.15	2	30.00	1	92.73	3 R	89.87	1
75.55	3	30.14	1	98.26	2	92.17	1
76.47	1	30.35	2	3302.51	1	92.45	3
78.11	3	31.10	3	03.14	1 +	92.81	5
79.06	1	33.17	2 R	03.70	1 +	94.74	2
79.62	1	34.11	4	06.12	8	97.12	2 R
80.35	5	34.74	3	06.50	8	97.76	1
80.86	2	36.35	3	07.35	1	99.49	5
81.65	1	39.56	5	10.48	1	3401.67	3
82.01	1	43.51	1	10.61	1	02.40	2
82.18	1	44.30	5	14.88	2 R	04.50	5
83.10	1	46.12	3	17.26	1	06.58	1
84.84	1	46.60	1	19.38	1	06.94	3
85.00	3	47.07	2	22.63	1	07.60	10
88.65	2	47.37	1	23.87	2	10.32	1

+	3473.46	1	3532.75	1	3575.50	2
	73.65	1	33.15	3	76.13	2
R	74.57	1	33.36	4	76.91	2
	75.59	10	34.68	1 +	78.51	1
	75.76	3	35.05	1	81.38	50 u
	76.51	1	36.71	5	82.35	2 R
+	76.85	10	37.64	1 R	83.50	2
	77.98	1	37.87	1	84.84	4
D	78.75	1	39.05	2	85.15	2
	83.16	2	40.28	2	85.47	5
R	85.15	1	40.85	2	85.88	5
	85.49	3	41.26	3	86.27	3
	89.81	1 R	42.24	3	86.93	1
	90.73	20	43.54	1	87.13	8
	93.46	1	43.81	1	87.56	1
	93.85	1	44.77	1	87.90	2
	95.45	3	45.79	3	88.75	3
	96.05	1	45.9	1 +	89.10	1
	97.29	4	47.33	1	89.26	4
	98.00	15	50.01	1 R	89.59	2
	3500.72	1	52.25	1	91.55	1 +
	05.02	1	52.96	2	92.86	1 +
	05.22	1	53.87	3	93.50	1 +
	06.66	2	54.25	3	94.77	4
R	08.64	2	54.65	1	95.45	1
	10.01	1	55.04	8	96.35	1
	10.60	1 R	57.02	5	97.20	1
	13.20	1	58.67	10	98.88	1
	13.99	10	59.22	1	99.30	1
	14.78	1	59.65	1	99.77	1
	16.55	1	60.85	1	3602.25	1
R	16.69	1	64.26	1	02.66	3
	18.85	1 +	64.68	1	03.35	4
	19.00	1	65.54	20 u	03.95	1
+	21.02	1	66.46	1	04.52	1 +
	21.43	10	66.75	1	05.35	1
	21.98	1 R	67.16	1	05.61	6
	22.44	1	67.50	1	06.84	8
	23.05	1	68.56	1	08.29	1
	23.46	1	70.00	1	09.01	20
O	24.25	2	70.14	1	10.32	6
	24.40	2	70.29	50 u	10.84	1
	26.20	3	71.36	1	12.24	2 R
	26.32	4	72.15	3	13.10	1
	26.55	3	72.75	1	13.30	1
R	26.81	3	73.55	1	13.62	1
	27.95	3	74.02	3	14.26	1
	29.97	3	75.28	1 +	14.70	1
	30.54	2	75.40	1	14.89	1

3615.33	1 +	3651.61	5	3688.61	1	3737.30	30 u
15.81	1	53.90	1 R	89.60	3	38.45	2 R
16.72	1	54.15	1 +	90.62	1	39.24	1
17.46	1	54.80	1	90.88	2	39.70	2
17.93	4	55.18	1 +	91.48	1	40.39	2
18.52	3 +	55.60	2	92.80	1	42.34	1
18.91	20	56.39	2	93.18	1	42.74	2
20.65	1	57.27	2	94.15	4	43.52	15
21.61	4	57.61	1	95.20	3	44.25	2
21.88	1	58.08	1 +	95.73	1 +	45.70	20
22.18	4	59.67	3	97.57	2	46.06	10
23.35	3	60.50	1 +	98.76	2	46.63	1
23.58	1	61.52	1	99.28	1	47.08	2
23.93	1	63.01	2	3701.23	4	48.40	20
24.46	1	63.40	1	02.17	2 R	49.07	2
24.97	1	63.61	1	02.65	1	49.62	30 u
25.29	3	64.11	1	03.67	1	51.98	1
28.24	1	64.72	1	03.83	1	52.56	1 R
30.50	2 R	66.40	2	04.00	1	53.74	3
31.24	3	67.00	1 +	04.61	2	54.64	1 +
31.60	20	67.40	2	05.74	20	56.20	1 +
32.19	3	68.11	1	07.19	2	57.08	1 R
32.70	2	68.37	1 +	08.06	20	57.63	1
33.13	1	69.29	2	08.76	1	58.39	30
33.41	1	69.67	4	09.39	20	60.20	2
34.00	1 +	70.20	2	09.75	1 +	60.67	2
34.47	2 +	70.97	1	11.36	2	63.99	20
34.81	2 +	72.84	1	11.56	1	65.69	4
35.32	1	73.23	1	16.05	2	66.84	1
36.32	2	74.10	1 + br	16.60	3	67.35	15
36.81	1	74.56	1	18.55	2 R	68.17	1
37.14	1	74.91	2 R	20.09	50 u	70.15	1
37.40	1	76.45	3	21.45	1 +	70.46	1
37.99	2	77.03	1	21.74	1 +	73.91	1 +
38.44	4 R	77.45	2	22.10	1	74.97	1 R
40.55	5	77.80	5	22.73	20	76.60	1
43.29	1 +	79.00	2	24.54	3	77.57	1
43.82	2 + d	80.09	10	25.65	1	78.65	1
44.97	1	80.95	2 +	27.05	2	78.83	1
45.26	1	81.40	1	27.24	1 +	79.60	1
45.65	1	81.81	1	27.79	15	81.35	1
45.97	2	82.39	5	28.81	1	86.10	2
47.59	1	83.21	5	30.55	2	86.30	2
48.00	30	83.79	1	31.10	2	86.81	3
49.43	2	84.26	4	31.54	2	88.02	10
49.65	3	86.15	3	32.55	4	89.32	1
50.17	2	86.40	1	33.49	10	90.25	4
50.44	2	87.24	1	35.02	50 u	90.90	1
51.30	1	87.60	10	35.46	3	92.31	1

3793.64	1 +	3850.17	8	3918.55	1	3990.00	1 +
94.05	1	51.01	5	18.77	2	90.57	1
94.49	2 R	52.74	2	19.21	1 R	94.28	1
95.16	10	54.52	1 +	20.42	10	96.15	1
97.66	3	56.53	15	23.10	10	97.55	4
98.67	10	59.36	3	25.80	2	98.20	2
99.71	10	60.03	30 u	26.11	2	4000.62	1 +
3801.84	1	61.48	1	28.10	15	01.81	1 R
01.94	1	61.75	1 +	30.49	15	05.42	15
02.15	1	63.90	1	31.27	1 +	06.48	1
02.44	1	65.72	8	32.77	1	06.78	1
04.17	1	67.35	2	35.95	2	07.44	1
05.50	4	69.73	1	37.47	1	09.85	2
06.35	1	71.89	1	41.03	2 R	13.96	1
06.85	3	72.70	8	41.40	1 +	14.68	2
07.68	3	73.91	2	42.59	2	17.26	1
08.87	2 R	76.18	1	43.47	1 +	18.40	1 +
10.90	1	78.19	15	45.01	1	22.01	2
12.05	1	78.75	15	45.25	1	24.87	1
13.14	10	84.50	1	47.14	1	29.86	1 +
13.80	1	85.66	2 R	47.66	1	30.63	2
14.02	1	86.45	20	48.25	2	32.13	1
14.67	2	87.21	10	48.90	2	32.79	1
16.00	20	88.67	10	50.10	3 R	34.64	2 (Mn)
16.46	2	88.94	1	51.32	2	40.81	1
17.79	1	91.01	1	52.75	2	44.06	1 +
20.61	50	92.56	1	53.30	1	44.77	1 R
21.33	3	93.54	2	55.51	1	45.99	50
21.97	2	94.09	1	56.10	1	50.02	1 +
24.24	1	94.17	1	56.60	2	55.01	1
24.60	20	95.83	10	56.81	4	55.17	1
26.07	30	97.60	1	57.16	1	57.49	1 +
26.99	1	98.05	2	63.26	1	58.39	1
28.00	20	98.16	3	64.65	1	58.90	1 +
29.58	1	99.18	1	66.21	3	62.60	2 R
30.99	1 +	99.89	10	66.75	3	63.50	1 +
33.46	2 R	3900.66	1	67.56	2	63.77	30
34.40	20	03.13	10	68.12	1	66.75	1
36.46	2	04.05	1 R	69.41	15	67.15	2
37.27	1	05.69	1 Si?	70.55	1	67.43	2
38.45	1 Mg?	06.62	8	71.47	2	68.15	2
39.40	2	08.06	1	73.84	1	70.95	1
40.61	15	09.83	1	76.75	1	71.92	20
41.22	15	09.97	1	77.01	1	73.95	1
43.13	1 +	10.99	1	77.90	3	74.95	1
43.39	3	13.79	1	81.95	2	76.79	3
45.31	1	16.85	2	84.13	2	78.51	1
46.55	1	17.30	3	85.55	1	80.02	1
46.94	2 R	18.46	1	86.34	1	80.40	1 +

4084.65	2 R	4175.79	3	4247.57	3	4352.90	4
85.16	1	76.72	2	48.36	1	58.67	1
85.46	2	77.76	2	50.31	10	66.05	1
87.24	1	81.94	4	50.99	15	67.75	1
95.15	1	82.55	1 R	55.68	1 +	68.06	1
98.34	1	85.08	3	58.50	1	69.95	3
4100.90	1 R	87.22	8	58.80	1	73.75	1
04.28	1	87.99	10	59.15	1	76.11	5
07.65	3	91.62	5	60.3	1 + br	82.96	1
09.97	3	91.8	1 +	60.68	20	83.71	100
13.13	1 +	95.50	2	64.39	1	88.06	1
14.60	2	95.78	1	65.45	1 +	88.59	2
18.70	4	96.40	1	67.14	1	89.43	1
20.38	1	98.47	5	68.00	2	91.50	2
21.97	1	98.80	1 +	68.93	1	4401.50	3
22.68	1	99.25	6	71.36	15	04.95	50
23.90	1	4200.12	1	71.95	30	07.87	4 R
26.35	1	01.10	1	74.07	1	08.58	5
27.77	2 R	02.20	10	78.40	1 +	15.31	20
27.95	1 +	04.15	3	80.07	1	22.74	5
32.25	15	05.72	1	82.59	10	27.50	8
33.06	2	06.87	1	85.60	1	30.37	1
34.03	1 +	07.31	1	88.30	1	30.79	5
34.55	1 +	08.77	1	90.55	1	31.83	1 +
34.83	3	10.52	4	91.05	1	32.71	1 +
37.16	2	13.82	1	91.64	2	33.32	4 R
40.10	1 +	16.33	3	94.32	15	33.92	1
43.59	5	17.70	2	98.20	1 R	35.33	2
44.05	15	19.52	3	99.40	15	37.11	1 +
47.84	3	20.51	1 R	4302.34	1	38.53	1 +
49.53	1 R	22.40	4	04.71	1	40.07	1 +
50.45	1	24.34	3	05.63	1	42.52	8
53.34	1	24.68	1 +	08.09	30	43.00	1
54.09	4	25.62	3	09.20	1	43.36	5
54.67	4	26.12	1	09.54	2	47.01	1 +
54.98	3	26.59	1	15.29	6	47.30	1 +
56.96	4	27.60	6	21.98	1	47.89	8
57.95	3	29.64	1	25.97	30	50.52	1
58.96	2	29.90	1	26.92	1	54.55	4 R
65.60	1 +	33.79	6	27.27	1 R	55.20	1 + Mn?
68.10	1 +	36.11	10	28.09	1	56.50	1 +
69.10	1 +	37.30	1	37.24	6	58.29	2 +
71.09	2	38.19	1	38.45	1	59.31	10
71.90	1	38.98	3	43.45	1	61.33	1
72.29	2	39.96	2	43.86	1	61.83	10
72.90	2	40.52	1	46.73	1 R	66.74	10
73.50	1	42.90	1	48.00	1	69.56	6
74.10	1	45.43	2	49.10	1 +	72.88	1
75.08	3	46.22	1	51.70	1	76.22	10

4479.79	1	4600.04	1 +	4745.97	2	4934.20	1 +
80.30	1	02.19	2	57.78	1	38.35	1 +
81.80	1	03.14	5	68.59	2	39.00	3
82.39	10	07.84	2	71.91	1	39.42	1
83.00	1 +	11.48	4	73.01	2	39.87	2
84.40	4	13.40	2	79.64	1 +	46.57	2 R
85.83	2	18.95	1	87.00	3	50.31	1
88.30	1 +	19.48	3	88.95	2 R	57.49	5
89.13	1 +	25.23	3 R	89.85	3	57.80	10
89.91	3 R	30.31	2	98.46	1 +	66.27	2
90.25	1 Mn?	33.10	3	4800.82	1	68.11	1
90.92	1	36.03	1	03.07	1	70.11	1
94.76	10	37.69	3	07.90	1	73.31	1
4505.00	1	38.20	3	32.88	1 +	78.79	1
14.38	1	43.67	2	36.01	1	82.70	3
17.70	2	47.62	3 R	38.67	1	83.48	1
22.77	1 +	50.05	1	39.70	1	84.07	2
23.60	1 +	54.77	5	43.30	1	85.42	1
25.31	4 R	57.80	1	55.86	1 R	85.73	1
26.63	2 +	61.73	1	59.90	6	89.13	1
28.80	10	62.19	1	63.85	1	92.50	1
29.80	2 +	67.64	4	71.50	8	94.32	2 R
31.32	5	68.30	4	72.31	8	5002.03	4
39.98	1 +	69.35	2	76.07	1 +	05.89	2
42.60	1 +	73.37	2	78.39	6	06.31	5
47.19	1 R	79.02	4	81.90	1	07.47	1
48.02	3	80.50	1 +	82.33	1	12.23	5
49.66	1	82.27	1 +	85.62	1 R	15.13	2
51.02	1 +	83.74	1	86.52	1 +	18.60	1 +
52.76	1	87.56	1 +	87.40	1 +	22.41	1 R
56.31	4 R	88.38	1 +	88.81	1	27.30	1
60.22	1	90.30	1	89.20	1 + d	28.28	1 +
64.90	1 +	91.58	4 R	90.96	8	41.21	2 +
65.50	1 +	4700.35	1 +	91.70	10	41.90	3
65.83	1 +	01.22	1 +	93.03	1 +	50.00	4
66.65	1 +	05.11	1	4903.50	5	51.83	3 R
67.06	1 +	05.62	1 +	07.92	1 R	54.85	1 +
68.93	1	07.49	6	09.60	1	60.30	1 +
74.39	1	09.22	2	10.21	1	65.16	4
74.89	1	10.46	3	10.52	1 +	65.35	3
80.74	1 +	21.16	1	10.76	1 +	67.33	1 +
81.69	2	27.58	2 R	17.41	1 +	68.99	4
83.93	1	28.71	2	19.20	10	72.25	1 + br
84.91	1	31.65	1	20.70	15	72.98	1 + br
87.24	1	33.74	3	24.10	1	74.90	8
92.84	5 R	36.01	1	24.96	2 R	76.50	1 +
95.55	1	36.96	6	28.07	1 +	79.11	2
96.23	1	40.50	1 +	30.51	1 +	79.41	3
98.30	2	41.70	2	33.52	1 +	79.92	2

5083.54	3	5196.26	1 +	5298.99	1	5411.15	20
91.01	2 +	97.70	1	5302.50	8	15.40	50
97.20	2 +	98.87	3	07.54	2	17.27	1 +
98.88	4	5202.49	5	15.25	1 + br	22.20	1 +
99.20	1 +	04.76	2	16.83	1 +	24.30	100
5105.72	1 +	08.77	6	20.25	1 +	29.94	20
07.62	2	15.37	6	21.30	1 +	30.76	1
07.81	2	16.41	6	22.25	1	33.15	1 + br
09.80	1 + br	17.53	5	22.83	1	34.76	15
10.57	3 R	18.07	1	24.38	20	35.20	1
21.81	2 +	23.33	1	25.24	1	35.60	1
23.90	3	25.70	1 R	26.33	1	36.50	1 +
25.31	5 +	27.02	5	28.21	15	36.80	1 R
26.43	1 +	27.35	8	28.70	8	40.12	1
27.54	2	28.16	1	29.64	1 +	41.60	1 +
29.81	1	28.57	1	30.18	2 R	41.75	1 +
31.64	2	30.01	5	32.90	1 +	45.28	20
33.85	15	33.15	20	33.10	2	47.15	20
36.25	1	34.76	1	33.50	1	47.97	1
37.58	10	35.54	2	40.15	10	48.60	1
39.42	3	36.32	1	41.21	10	55.81	50
39.64	8	38.27	1	43.60	1 +	56.69	1
41.92	2	42.63	3	49.9	1 + br	61.25	1
42.70	2	43.94	1	53.57	3 R	61.75	1 +
43.11	2	47.18	1	61.8	1 + br	63.15	8
45.27	1	50.35	1	62.95	1	63.49	10
48.38	5 + d	50.82	3	65.00	20	64.49	1 R
51.02	2 R	52.15	1 R	65.60	3	66.62	4
52.11	2	53.62	2	67.61	20	67.20	1
59.23	1 +	55.10	1	70.13	20	70.36	1
62.52	8 r	55.50	1	71.70	15	72.93	1
64.70	1	63.50	5	72.55	1	74.12	5
65.60	3	64.05	1	73.90	2	76.48	3
66.47	2	66.75	15	77.02	1	76.79	8
67.67	20	69.70	20	79.78	2 R	78.65	1
68.50	1	70.53	15	83.58	50	81.06	2
69.14	5	71.40	1 +	86.60	1 +	81.46	2
70.91	1 +	72.00	1 +	87.75	1 +	81.65	2
71.79	10	73.39	3	89.70	8	83.30	2
72.81	1	73.54	2	91.75	6 d	87.35	1
76.87	1 +	75.2	1 + br	93.41	10	88.00	6 +
77.43	1 +	76.18	1 +	95.47	1 +	92.06	1
80.20	1	80.09	1	97.35	15	93.71	1 R
84.50	1 +	82.01	8	98.49	3 +	94.67	1
88.08	1 R	83.83	10	5400.72	10	97.71	8
91.62	10	84.69	1 +	02.70	1	5501.69	8
92.51	10	85.30	1 + Ni?	04.84	50 d?	03.30	1 +
95.09	5	88.71	1 R	06.02	15	06.99	8
95.65	4	94.16	1	09.34	1 + R	08.55	1 + br

5510·75	1 + br	5650·20	1 +	5816·53	5	6157·93	3
12·50	1 +	52·55	1 +	38·6	1 + br	63·75	1 +
19·72	1	54·2	1 + br	52·40	1 +	65·56	2
22·70	2	55·4	1 +	56·29	1	70·69	5
25·77	2 R	55·71	3	59·83	4	73·55	2
32·99	1	55·9	1 +	62·52	10	80·41	2
35·63	3	59·00	15	84·09	3	85·92	1 +
38·75	1 +	61·00	1	5905·90	3	88·23	2
39·50	1 +	61·59	1	10·20	1	91·80	10
43·39	3	62·73	10	14·35	10	6200·52	3
44·18	3	63·15	1 +	16·49	1	13·64	3
46·73	2 R	67·71	2	28·06	1	15·34	2
47·23	1 +	79·20	3	30·40	10	19·49	4
53·78	1 +	80·47	1 +	34·93	3	27·00	1
55·07	6	83·34	1 +	49·6	1 + br	29·46	1
58·12	2	86·69	5	53·00	2	30·93	10
60·45	2	91·76	2	56·92	1	32·88	4
62·90	2	93·88	2	75·58	2	40·90	1
63·80	3	96·3	1 + br	77·06	3	46·53	10
65·82	6	98·25	1	83·94	4	52·77	10
67·57	2	98·62	1	85·01	8	54·47	3
69·82	10	5700·50	1 +	87·26	4	56·57	2
73·09	20	01·79	4	98·04	1 +	65·36	3
76·30	10	05·0	1 + br	6003·24	4	70·44	1
84·96	1	05·73	2	08·20	2	71·55	1 +
86·98	30	06·21	4	08·82	4	80·85	1 +
87·78	1	07·29	1	20·38	10	91·20	1 +
94·82	3	08·30	1 +	24·30	15	98·03	2
98·49	5	09·63	10	27·26	3	6301·76	10
5600·47	1	12·13	1	42·30	3	02·76	3
03·18	10	12·40	2	56·20	5	11·75	1 +
07·85	1 +	14·39	1	65·72	10	15·55	1
15·89	50	15·33	2	78·69	5	16·03	1
16·77	1 +	18·07	3	79·25	1 +	18·25	4
17·42	1 +	31·99	3	82·97	1	22·94	2
18·84	2	42·09	1	85·49	1	31·0	1 + br
19·75	1 +	48·15	1 +	89·75	1	35·52	4
20·25	1 +	52·23	2 +	94·0	1 + br	37·02	5
20·71	1	53·37	5	96·94	1	39·1	1 + br
24·28	1 +	62·65	1	6102·39	5	44·35	1
24·80	10	63·25	10	03·41	3	55·25	1
34·20	3	75·31	2	16·43	1 +	58·90	1
36·05	1 +	80·9	1 + br	28·08	2	63·15	1
36·88	1	82·37	5	36·83	10	64·6	1 + br
37·50	2 + br, d	91·27	1	37·12	2	64·9	1 + br
38·47	3	94·17	1	37·92	10	80·98	1
41·68	2	98·43	1	41·99	3	93·83	15
44·2	1 + br	5806·93	2 +	48·04	1	6400·25	20
49·90	1 +	09·49	1	51·84	1	00·55	1 +

6408.24	3	6475.89	1 +	6594.14	2	6810.55	1 +
11.90	10	82.15	1 +	6609.36	1	28.87	1 +
20.21	3	95.25	20	27.80	1 +	41.60	1 +
21.60	5	96.70	1 +	34.00	1 +	43.95	1 +
31.09	5	6518.67	2	63.62	2	55.45	1 +
36.65	1 +	46.48	3	78.22	4	6945.48	1 +
56.63	1	69.45	2	6726.95	1 +	79.15	1 +
62.99	2	75.20	1	50.43	1	7187.70	1 +
69.48	1 +	93.17	3	52.98	1 +		

XXV. Fl. Fluor.

Ältere Messungen: Fehlen.

Material: Fluorammonium auf Gaskohle.

Linienzahl: 0.

XXVI. Ga. Gallium.

Ältere Messungen: W. N. Hartley und H. Ramage, Astroph. J. 9 (1899). J. M. Eder und E. Valenta, Wiener Akad. 119 II a. (1910) (Rot).

Material: Galliumnitrat aus Metall von Lecoq de Boisbaudran, auf Gaskohle.

Verunreinigungen: Al.

Linienzahl: 14.

2450.18	2 + u	2874.35	10 u	4033.18	30 u	5360.0	1 + br
2500.27	2 + u	2943.77	10 u	4172.22	30 u	6397.10	20 +, r
2659.94	2	44.29	5 u	5354.0	1 + br, r	6413.98	8 +, r
2719.76	3	3020.61	3				

XXVII. Gd. Gadolinium.

Ältere Messungen: J. M. Eder und E. Valenta, Wiener Ber. 119 II a. (1910) (Rot).

Material: Gadoliniumnitrat von L. Haitinger, auf Gaskohle.

Verunreinigungen: Ce, Sa, Y.

Linienzahl: 1687.

2468.32	1	2769.93	2	2794.83	1	2833.97	1
88.83	1	70.29	2	97.06	3	36.80	1
2720.59	1	79.21	1	2808.47	1	37.10	1
42.50	1	81.54	2	09.83	3	40.34	2
50.30	1	90.42	1	11.05	1	40.43	1
64.16	2	92.10	2	14.11	1	41.45	1
68.61	1	92.19	1	33.86	2	54.01	1

3034.20	8	3121.91	1	3215.41	2
40.45	1	23.85	1	23.90	3
43.13	1	24.16	3	24.40	1
46.59	1	24.40	2	25.57	2
52.63	1	25.04	1	26.44	2
53.70	3	27.37	1	32.85	1
57.52	1	27.84	1	33.03	1
58.06	1	28.70	2	33.23	1
58.20	1	29.83	1	36.26	1
60.01	1	30.11	2	37.36	1
67.73	1	30.53	1	37.74	1
68.80	4	30.95	2	38.84	1
69.34	1	32.54	1	38.98	1
69.55	1	33.25	2	41.25	1
72.74	3	34.00	3	42.43	1
77.08	3	35.20	3	42.95	1
77.21	3	37.05	1	48.16	1
81.10	1	37.45	1	50.32	1
82.15	10	38.06	1	55.96	1
83.48	1	38.21	1	56.53	1
84.15	1	38.81	1	57.05	1
85.17	1	39.28	1	57.16	1
85.74	1	40.94	1	59.39	1
86.34	1	43.03	2	60.07	1
87.13	1	43.29	3	63.50	1
89.31	1	45.15	6	64.29	1
90.10	3	45.62	4	66.86	2
90.50	1	46.99	3	67.77	2
90.69	1	56.61	4	68.45	2
91.98	1	58.75	1	70.65	1
92.15	2	60.83	2	71.87	2
96.31	1	61.49	4	74.30	1
96.92	1	65.11	1	77.64	1
98.75	4	67.30	1	79.63	1
99.01	3	68.23	1	80.05	1
3100.66	10	68.36	1	81.75	2
01.30	2	69.66	1	82.40	2
01.53	1	71.20	1	89.23	1
02.04	3	73.00	1	91.60	2
02.69	4	87.21	1	92.35	3
05.65	1	90.40	1	94.21	2
08.48	2	91.15	1	98.65	1
11.30	1	93.31	1	3308.66	1
13.30	2	96.64	1	09.71	1
18.07	1	99.40	1	13.50	1
18.72	2	99.67	1	13.89	2
19.16	2	3203.51	1	15.74	2
20.09	3	06.55	1	16.47	1
20.29	2	07.82	1	16.69	1

3317.39	1	3403.21	1	3468.22	2	3553.87	1
18.19	1	03.43	1	69.13	5	54.63	1
20.58	2	05.67	1	69.44	1	54.94	1
21.50	1	07.06	1	73.04	1	55.47	1
29.47	2	07.75	5	73.41	5	57.22	5
30.50	3	09.42	2	76.45	2	58.32	4
31.59	5	11.15	1	78.16	1	58.59	4
32.30	3	12.15	1	79.66	1	60.75	1
34.21	1	12.72	1	80.70	1	62.05	1
36.34	4	12.88	1	81.49	8	63.93	1
37.11	1	13.40	2	82.00	6	64.19	2
45.55	1	14.32	1	82.78	3	64.54	1
46.15	4	17.09	6	86.34	2	64.75	1
50.21	2	17.44	1	91.85	1	67.20	1
50.63	8	18.87	8	92.10	6	67.30	1
52.68	1	19.17	1	94.16	1	67.77	1
56.63	1	22.06	1	94.57	6	69.69	1
57.75	1	22.62	10	97.50	1	70.54	1
58.57	2	22.76	3	3501.74	1	72.07	4
58.77	8	24.07	5	03.35	1	74.83	3
60.86	3	24.73	5	05.05	1	76.50	
61.86	1	25.77	1	05.68	5	76.86	2
62.40	8	26.08	3	10.26	1	78.48	3
63.08	1	26.46	2	10.71	1	78.71	2
64.36	2	27.45	1	12.38	4	79.68	2
65.72	2	28.57	2	12.66	4	80.76	2
67.22	1	30.40	1 + d	13.80	2	82.06	5
67.79	1	31.13	1	16.88	1	85.12	10
69.76	2	31.65	1	18.01	1	86.68	1
70.55	1	33.18	5	18.76	1	87.28	2
73.00	1	39.37	8	22.60	1	88.33	1 +
74.82	2	39.93	3	24.37	5	90.60	4
79.87	2	40.13	8	25.28	1	91.56	2
80.17	1	41.92	2	28.67	3	92.05	2
80.67	2	46.42	1	30.30	1	92.85	6
82.39	1	49.74	3	31.73	1	93.56	2
88.75	1	50.52	6	34.15	1	94.83	1
89.05	1	51.40	4	34.35	1	96.99	1
91.04	1	54.30	3	35.05	1 +	97.83	1
91.45	1	55.03	4	37.24	2	98.94	1
92.70	5	55.39	1	37.61	1	3601.11	3
93.76	2	57.17	2	42.48	1	02.15	1
95.27	3	62.08	2	42.90	4	05.00	4
97.35	1	63.14	3	45.10	2	05.35	3
97.42	1	64.10	3	45.94	10	05.76	3
99.53	2	64.24	3	48.43	1	07.21	2
3400.12	3	66.65	1	48.64	1	08.01	1
01.20	2	67.09	3	49.08	1	08.87	4
02.20	3	67.43	5	49.52	10	09.28	1

3610·89	4	3687·90	5	3767·21	5	3850·85	8
11·03	3	93·76	1	68·60	20	51·15	8
13·05	1	94·17	2	69·59	4	52·65	10
13·58	5	96·90	2	70·15	1 (Fe)	55·72	4
14·33	2	97·89	5	70·39	1	63·20	2
14·56	2	99·90	4	70·86	4	67·13	2
17·32	3	3709·30	1	71·37	1	75·47	2
18·22	1	12·88	8	74·46	2	84·82	1
20·61	3	13·71	3	74·70	1	87·28	1
22·96	2	15·36	1	76·15	1 +	87·87	1
25·02	2	16·52	5	76·99	1	89·10	1
25·37	2	17·60	4	77·25	1	90·30	1
26·50	2	19·63	10	78·92	1	90·59	1
27·02	1	22·24	3	82·51	4	91·02	1
29·28	1	23·84	1	83·22	4	94·88	8
29·66	2	25·63	3	87·70	4	95·39	2
30·39	1	31·01	5	90·77	1	95·93	4
31·02	1	32·61	2	91·31	4	96·58	1
34·91	3	32·81	1	91·86	1	98·55	1
36·96	1	33·22	3	92·52	2	3902·57	5
39·16	2	36·60	1	95·65	1	02·89	1
40·32	3	39·90	2	96·08	1	04·45	1
41·51	3	40·19	3	96·62	10	05·80	1
42·68	1	42·05	1	3801·50	4	07·26	1 +
45·75	4	43·68	10	03·25	2 +	10·36	1
46·30	15	44·25	1 +	04·90	2	12·88	1
48·60	2	44·98	2	05·26	2	13·92	1
49·11	1	46·57	1 +	05·69	3	16·70	10
49·34	1	49·01	1	08·30	1	18·21	1
49·56	2	50·35	1 +	10·43	1	18·40	1
51·09	2	51·27	1 +	10·75	1 +	23·43	4
51·33	2	52·42	1 +	11·51	2	26·83	1
52·69	3	54·46	1	12·20	2	33·15	1
54·78	8	55·38	1	14·18	10	34·95	6
56·31	8	55·69	1	14·94	2 +	35·53	1
58·35	1	56·23	1	16·78	3	38·26	1
59·25	1	56·45	1	18·87	2	39·12	1
61·82	1	57·87	2	21·66	1	41·94	1
62·41	4	58·11	3	25·17	1	42·78	2
64·78	8	58·46	5	26·19	2	43·35	1
68·46	1	59·18	4	27·46	2	43·75	1
71·39	10	60·86	3	29·52	2	45·66	3
72·15	1	61·10	3	33·15	2 +	49·38	1
74·22	3	62·38	3	35·13	2	51·14	3
74·60	1	63·15	2	36·66	3 (Cy)	53·51	2
79·35	1	63·48	2	37·05	3	57·83	6
82·90	1	64·36	3	39·76	3	58·85	1
84·29	3	64·75	2	42·32	3	59·65	6
86·49	3	66·50	1 + br	44·70	4	60·27	1

3962-25	1	4036.98	1	4098.80	10	4197.21	3
63.81	2	37.49	10	99.08	5	97.82	4
66.45	2	38.03	8	4100.42	3	4202.65	2
67.01	1	39.63	1+	01.45	1+	05.00	5
68.45	1	39.80	3	02.85	1+	12.16	8
69.15	2	42.90	1	05.16	1+	15.13	6
69.45	2	43.85	1	05.93	1+	17.31	5
71.24	2	45.16	3	08.55	1	23.16	1
71.91	4	45.26	2	10.79	2	25.26	5
72.34	1	46.97	3	11.60	4	26.02	8
72.86	2	47.23	1	11.92	2	27.27	3
74.17	4	47.95	2	13.95	1	29.94	3
74.99	1	48.73	2	15.54	1	32.63	1
75.28	1	49.34	1	19.54	2	35.24	1
79.49	3	49.59	8	23.16	1+	38.97	4
83.17	2	50.05	10	26.32	1+	41.45	1
87.38	3	50.51	1	27.83	1+	44.00	2
87.96	2	53.48	5	28.53	1+	45.50	1
89.38	1	53.82	5	30.59	15	46.70	3
91.84	1	54.89	3	31.65	3	51.90	10
92.85	1	56.17	1	32.45	6	53.50	5
93.40	3	58.40	4	34.31	3	53.76	5
94.36	4	59.55	2	35.60	1+	55.58	1
96.50	5	60.05	2	37.26	5	55.69	1
97.94	3	61.47	2	40.60	2	60.25	3
4001.40	3	62.78	4	41.18	1	62.24	10
02.09	1	63.62	20 d	49.00	2+	66.75	3
03.99	1	65.78	1	50.81	1+ br	67.15	3
05.07	3	66.20	1	51.80	1+	68.89	3
07.11	1	68.51	2	52.50	1+ br	70.47	1
08.46	1	68.93	1	53.69	2	74.32	2
09.06	3	70.51	10	55.03	2	78.35	1
09.35	2	73.40	4	60.00	1+	80.69	8
13.59	1+	73.99	10	62.88	4	82.95	1
13.95	2	75.63	1	63.22	3	85.96	2
14.07	1	78.60	6	65.55	1+	86.26	2
15.35	1	78.87	6	67.35	2+	90.03	1
15.73	1	80.70	1	70.27	2	96.22	5
17.37	1	83.87	2	71.86	2	96.46	3
17.84	1	84.10	1	73.73	2	97.31	3
19.86	1	84.86	1	75.73	5	98.60	1
22.48	3	85.73	10	81.05	2+	99.45	2
23.28	3	87.85	3	84.48	10	4303.62	1
23.48	3	88.96	1	88.20	2	04.22	1
27.75	1	90.58	3	90.90	4	05.05	3
28.30	3	92.89	4	91.21	4	06.49	4
31.02	3	93.90	1	91.50	1	07.48	1
33.65	3	94.66	4	91.75	2	08.43	2
35.54	1	98.20	1+	93.29	1	09.45	2

4310·10	1	4366·68	1	4416·16	1	4467·23	3
11·14	3	67·45	1 +	17·43	1	67·33	3
12·17	1 +	68·73	1	19·22	5	68·35	1
14·00	4	69·30	2	20·80	1	70·61	1
14·54	3 d	69·91	5	21·39	3	71·43	3
16·20	5	70·33	2	22·62	6	72·04	1
16·39	3	72·19	1 +	24·27	2	73·13	1
20·66	2	73·99	4	25·18	2	73·43	1
21·30	5 d	74·39	1	26·30	2	74·29	3
22·35	3	76·20	1	27·18	1	74·74	1
23·07	1 +	78·24	1 +	27·76	1	76·29	4
23·80	1	78·70	2	29·10	1	77·35	1 +
24·21	3	79·70	1	29·62	1 +	77·95	1 + d
24·71	2	80·82	3	30·82	5	78·95	4
25·83	10	81·30	1	31·90	2	81·23	4
26·47	2	82·25	3	33·82	2	83·49	4
27·29	10	83·30	3	36·38	4	84·68	1
29·08	1	86·36	1	37·60	1	84·88	2
29·72	2	86·87	1 +	38·04	1	85·63	1 + d
30·45	1	87·32	1	38·40	4	86·51	2
30·73	3	87·81	5	38·62	1	86·75	1
31·05	1	89·12	2	39·22	1 +	88·60	2
31·53	2	90·06	2	44·80	1	88·73	1
33·39	1	90·14	1	45·15	1	89·10	1
35·40	2	91·12	3	45·61	1 +	91·44	1
36·36	1	91·61	2	46·65	3	91·95	1 +
36·90	1 +	91·80	1	47·53	1	92·20	1
37·65	2	92·22	2	48·31	1	92·90	1 +
40·41	1	94·27	1 +	49·16	1	93·30	1 +
40·73	1	94·88	2	49·56	1	93·84	1 +
41·43	8	97·66	3	50·13	1	94·05	1 +
42·35	10	98·66	1	50·70	1 +	95·10	1
44·43	2	99·19	1	51·85	1 +	95·23	1
44·59	1	4400·35	2	52·50	1	96·78	1 +
46·60	5	00·93	2	52·86	2	97·31	3
46·78	4	02·02	5	54·08	2	97·50	2
47·42	3	03·30	3	54·88	2 +	97·72	1 +
51·05	1 +	06·82	5	56·80	1 +	98·44	3
52·81	1	07·38	1 +	58·50	1 +	4500·06	1
53·93	1	08·41	4	60·00	1 +	00·81	1
54·20	1	09·40	2	60·97	1	01·00	1
56·89	1	10·48	1 +	61·28	1	01·36	1
58·01	1	11·31	3	61·52	1	01·60	1
59·30	2	12·1	1 + br	62·98	2	01·98	1 +
59·77	2	12·9	1 + br	63·39	2	02·30	1 +
60·29	1	13·62	1	64·50	1 +	03·40	1
61·07	3	14·32	4	64·89	2	03·96	1
62·42	1	14·90	3	65·93	1	06·39	3
64·28	2	15·48	1	66·71	5	06·51	4

4507·10	2 +	4541·38	1	4581·25	2	4644·53	1 +
07·60	1	41·80	1	81·44	2	45·60	1 +
07·83	1	42·19	2	82·55	3	46·15	2
08·18	1	42·90	1	82·70	3	46·49	2
09·20	2	43·50	1	83·21	2	47·81	1
10·54	1	43·76	1	83·48	1	48·81	2 + d
11·30	1 + br	44·40	1	84·43	1	49·90	1 +
11·93	1 + br	46·42	1 +	86·24	1	50·15	1
12·63	1	46·80	1 +	87·14	2	51·55	1 +
12·78	1	47·20	1 +	88·93	1	52·10	1
13·41	1	48·17	2	89·70	1	52·49	1
13·71	1	50·20	1 +	90·16	1 +	53·70	2
13·98	1	50·60	1 +	90·95	1 +	53·90	1 +
14·18	1	51·10	2	94·17	1	55·16	2
14·70	3	51·64	1	94·44	1	58·00	1
14·90	1	52·20	1 +	97·14	4	58·77	1
16·00	1	52·49	1	98·07	4	59·58	1
16·62	1	53·25	2 + d	99·05	3	60·02	1 +
17·20	1 d	55·15	2	4601·20	5	61·35	1 +
18·59	1 +	55·67	1	03·08	2	64·40	2
18·95	1 +	58·26	3	05·70	1 +	65·80	1 +
19·80	4	59·20	1 +	06·22	2	66·61	2
20·24	3	59·80	1 +	06·78	1	71·02	2
21·44	2	60·63	1 +	08·16	2	73·85	1 +
22·10	3	61·22	2	08·73	1 +	74·24	1 +
22·60	1	61·68	1	11·13	1 +	74·55	1 +
22·98	3	61·92	1	14·66	3	74·70	1 +
24·29	1	62·85	1	19·33	1 +	75·35	1 +
24·55	1	63·17	1	19·80	1 +	75·90	1 +
24·88	1 d	63·56	1	20·60	1 +	77·15	1
25·59	1 +	63·88	1 +	22·75	1 +	77·80	1
25·72	1 +	64·77	1 +	24·55	2	78·40	1
26·23	1 +	67·01	1	25·86	1	79·35	1
30·80	1 + br	67·95	1	26·85	1 +	80·19	3
31·25	1 + br	68·20	1	27·40	1 +	82·04	1 +
32·00	2	68·82	1 +	27·81	2	83·25	1
32·44	1 +	69·70	1 +	28·25	1 +	83·50	3
32·80	1 +	70·21	1	28·56	1 +	86·56	2
33·68	1	70·50	1	28·93	1 +	88·29	2
34·70	1 +	70·76	1	30·66	1	88·55	1 +
34·90	1 +	71·11	2	32·10	1 +	89·15	1 +
36·07	1	71·70	1 +	32·60	1 +	91·33	1
36·53	1	72·36	1	36·80	3	93·00	1
36·71	1	72·60	1 +	37·44	1 +	94·48	3
37·12	2	72·72	1 +	38·77	1	95·27	1 +
37·96	4	73·38	1 +	39·15	3	95·65	2
39·36	1	73·95	2	40·20	2	95·92	1
40·18	3	76·03	3	40·70	1	96·16	1
40·40	1 +	79·73	3	41·46	1	96·91	1 +

59	3	4764.00	2	4848.25	2	4932.40	1	
19	1	65.70	1	52.02	1	32.83	1	+
05	1	67.10	1	52.82	1	36.18	2	
46	1	67.41	3	54.32	1	36.50	2	
30	2	68.92	1	55.02	1	37.10	1	
45	1	72.93	1	56.35	1	38.74	3	
93	1	76.03	1	56.90	2	39.69	1	
04	1	76.30	1	59.40	2	42.71	1	
93	3	80.12	1	60.65	1	44.89	1	
32	1	81.20	1	61.97	2	45.89	1	
55	1	81.31	1	62.45	1	48.71	1	
35	1	82.10	3	62.76	2	50.24	1	
44	2	83.68	1	63.30	1	51.70	1	
66	1	84.80	3	65.20	2	52.60	2	
98	2	86.98	5 d	66.57	2	53.30	1	
36	1	91.33	1	70.21	2	54.17	1	
44	1	91.80	1	71.69	2	55.56	1	
3	1	93.49	1	73.51	2	56.95	1	+
7	1	93.61	1	76.61	1	58.91	2	
0	1	97.17	1	77.76	1	61.60	1	
8	1	97.68	1	78.26	1	65.20	1	
0	2	99.84	1	78.68	1	67.63	1	
0	1	4800.05	1	81.29	2	68.73	1	
4	1	00.30	1	81.56	2	69.31	2	
4	1	00.85	1	82.13	2	72.85	1	
7	1	01.22	3	83.38	2	73.99	1	+
5	1	02.75	2	84.16	1	74.40	1	+
8	1	03.70	2	86.66	1	75.29	1	
2	5	05.98	2	88.73	1	78.68	1	
0	1	06.35	1	89.40	1	80.35	1	
0	1	07.61	2	92.25	1	85.04	1	
3	4	08.20	1	92.75	1	85.42	1	
9	2	10.15	1	93.60	1	86.34	1	+
0	2	10.53	1	94.47	3	86.52	1	+
7	1	12.74	1	99.55	1	87.56	1	
3	1	13.95	1	4902.57	1	92.38	1	+
0	3	14.61	1	03.00	1	95.48	1	
7	2	15.21	1	06.57	1	96.03	1	
9	1	17.00	2	10.29	2	98.54	2	
3	1	19.98	1	11.00	1	99.22	2	
1	21.86	3		14.65	1	5005.18	1	+
1	22.13	1		16.00	1	11.00	2	
1	30.11	1		16.75	1	11.93	1	
1	34.39	3		16.95	1	15.21	4	
1	35.41	2		20.49	1	17.40	1	
1	39.74	1		23.70	2	19.54	1	
1	43.99	1		25.89	1	20.55	1	
3	44.42	1		30.00	1	23.30	1	
2	46.66	1		30.86	1	31.46	2	

5031.75	1	5176.46	3	5298.75	1	5370.10	3
39.81	1	78.30	1	5301.80	3	70.87	4
48.90	1	79.02	1	02.89	3	72.39	2
51.04	2	80.10	1	03.80	1	75.56	1
52.56	1	83.31	1	04.42	1	77.40	1 +
56.74	1	87.10	1	05.07	1	80.45	1
56.84	1	87.41	1	06.17	1	84.33	2
57.40	1	88.06	1	06.87	2	85.56	2
61.07	1 +	91.27	1	07.45	3	89.68	3
61.20	1 +	97.95	3	12.00	2	93.85	1
63.04	1	99.28	1 +	15.96	1 +	94.50	1
63.75	1	5200.72	1 +	16.95	1	99.74	1
66.29	1	10.66	1	18.45	1	5400.15	1 +
67.22	1	11.21	1	19.00	1 +	11.37	1
70.36	1	17.58	1	21.39	2	12.80	1
71.19	1	19.59	3	21.63	2	13.40	2
73.15	1	20.45	2	21.95	3	13.55	1
73.90	1	34.10	1	22.51	1	15.86	2
77.80	1	37.65	1 +	22.85	2	17.30	1 +
82.99	1	44.52	1 +	23.56	1 +	20.05	1
88.98	1	47.03	1	27.49	3	21.35	2
92.41	3	51.33	3	28.49	2	23.80	1 +
93.85	1	52.29	2	31.20	1	24.84	1
96.23	2	54.91	2	32.08	2	33.05	1 +
97.07	1 +	56.00	3	33.41	3	36.47	2
98.56	2	59.82	1	37.68	2	41.34	1 +
99.45	1 +	60.59	1	40.75	1 +	41.76	2
5101.10	1	61.00	1	41.31	1	47.90	1
02.95	1	63.99	1	41.95	1	52.85	1 +
03.63	4	67.50	1 +	43.17	3	53.20	1 +
09.09	3	67.97	1 +	45.26	2	53.63	2
12.10	1 +	68.20	1	45.80	2	55.48	2
23.80	1 +	68.97	2	48.80	3	59.75	1 +
25.70	2	71.15	1	49.81	1	60.80	1 +
30.42	2	71.60	1	50.51	5	63.45	1
32.40	1	71.95	1	53.38	4	69.22	1
35.75	1	72.55	1	54.56	1	69.90	2
36.20	1	73.10	2	55.01	1 +	70.70	1
41.00	2	74.98	1	56.20	1 +	75.88	1
41.65	1	75.84	1 +	57.95	1	80.42	1
42.82	1	76.71	1	59.32	2	82.20	1
50.00	1	80.81	1	61.82	2	91.62	1 +
56.00	3	82.66	2	62.35	1	91.85	1 +
56.94	1	83.23	3	62.76	1 +	93.60	1
58.67	1	84.04	1	65.54	2	93.90	1 +
61.08	1	84.60	1	66.54	1	98.95	1
63.88	1	86.00	1	67.86	1	5500.15	2
64.73	1	95.72	1 +	68.96	1	00.61	2
76.03	1 +	96.51	1	69.80	1	02.75	1 +

10	1 +	5630·35	1 +	5818·74	2	6001·20	1 +
40	1 +	32·20	1 +	49·03	1 +	62·10	1 +
29	1	32·47	3	51·84	5	64·81	3
85	1 +	33·70	2	55·43	2	68·97	2
60	1 +	43·44	4	56·42	5	71·37	1
73	1 +	43·90	1	57·21	1	71·37	2
78	1 +	45·04	1	60·98	3	74·32	1 +
33	1 +	53·53	1	69·18	1 +	75·30	1 +
40	1 +	57·55	1 +	70·44	1 +	79·77	1 +
91	2	61·63	1 +	70·83	2	60·20	1 +
77	1	72·33	1	72·90	1 +	64·58	2
70	2	77·68	1	77·00	1	80·91	3
02	1 +	86·87	1	77·50	3	82·63	2
56	1	92·34	2	80·19	1 +	6106·44	2
47	1	96·40	5	82·47	1 +	69·31	2
71	1	98·20	1	84·83	1 +	14·26	10
40	1	5701·59	3	86·71	2	32·6	2 + - br
50	1	09·66	2	97·90	1	35·30	1 +
97	1	10·59	1	98·30	1	36·70	2 +
21	1	11·60	1 +	5901·91	1	38·60	3
41	1	22·22	1	04·30	3	51·40	2 +
40	1	24·97	2	04·81	3	53·22	1 +
93	1	28·55	1 +	08·67	1 +	54·30	1 +
90	2	32·39	1	11·70	1 +	64·71	2
85	1	34·10	3	13·80	3	68·40	1
45	1	36·20	2	17·01	2	68·69	1 +
84	1 +	44·83	2	21·60	1	69·20	1 +
30	1 +	46·51	3	22·30	1	72·20	1 +
81	1	49·59	2	30·59	3	76·50	1 +
10	1	52·05	2	37·10	3	76·88	1 +
86	3	54·40	3	37·96	2	80·63	3
36	1 +	59·40	1 +	42·47	1 +	87·25	1
50	1	69·99	2	44·23	1 +	6203·90	1
05	2	76·25	3	51·86	1 +	64·41	1
70	1	78·75	1 +	56·71	2	11·90	1 +
34	2	89·60	1 +	63·45	1	12·40	1 +
40	1	91·61	4	68·60	1	18·20	1 +
10	1 +	97·01	2	70·60	2	21·10	1 +
40	1 +	99·85	1 +	77·53	3	24·68	1
15	1 +	5801·53	1 +	77·95	1	34·52	1 +
47	1 +	03·14	3	82·70	1	36·52	1 +
16	1 +	07·27	2	83·67	1	38·73	1
67	1	07·95	2	84·80	1	41·40	1 +
40	1	09·49	3	87·39	2	49·32	1 +
11	3	16·10	3	88·29	2	55·95	1 +
71	1	21·20	3	91·10	1	59·35	1
64	1	23·17	2	92·13	1	60·07	1
13	1 +	40·70	2	96·97	1	60·60	1
76	3	45·96	1	99·35	3	61·39	1 +

6263·99	1	6331·61	2	6408·84	1	6565·09	2
67·4	1 + br	34·00	1	22·19	1	79·63	1
70·42	1 +	36·60	1	45·10	1	91·89	1
78·40	1	46·90	2	62·90	1	6634·59	2
89·99	3	48·15	1	70·55	1	40·30	1
93·12	2	51·50	1 +	80·36	1	44·20	1 +
99·33	1	60·83	1 +	84·25	1 +	81·50	1
6305·39	4	63·47	1 +	97·25	1 +	6731·04	1
09·35	1 +	69·06	1	6505·70	1	52·91	1
14·47	1 +	81·21	2	38·41	2	6828·55	1 +
17·43	1	83·46	1	49·53	1		

Kanten.

4578·13	K. V.
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Hintergrund mit Banden von 5800 bis 6300.

XXVIII. Ge. Germanium.

Ältere Messungen: H. A. Rowland und R. R. Tatnall. *Astroph. J.* 1 (1895).

Material: Germaniumnitrat aus Metall von C. Winkler, auf Gaskohle.

Verunreinigungen: Ag, Ga.

Linienzahl: 27.

2314·30	1 +	2417·46	3	2644·30	2	2794·04	3
28·00	1 +	36·5	1 +	51·28	30	2829·11	3
38·74	1 +	98·08	3	51·69	20	3039·22	50
79·24	1	2533·34	3	91·45	20	3124·97	10
89·54	1	56·43	1	2709·70	30	3269·62	20
94·20	1 +	89·25	3	40·52	8	4686·08	5
98·01	1 +	92·64	20	54·69	30		

XXIX. H. Wasserstoff.

Ältere Messungen: Fehlen.

Material: Ammoniumfluorid auf Gaskohle.

Linienzahl: 0.

XXX. Hg. Quecksilber.

Ältere Messungen: H. Kayser und C. Runge, *Berl. Akad.* (1891).

J. M. Eder und E. Valenta, *Wiener Akad.* 119 IIa. (1910) (Rot).

Material: Metall mit Gegenelektrode aus Gaskohle.

Verunreinigungen: Pb.

Linienzahl: 78.

2374·8	1 + br	2753·03	20	3095·5	1 +	4078·02	10
78	2 + br	60·0	1 + br	3125·76	200 + u	4313	1 + br, v
2447·2	1 + br	74·7	1 + br	31·66	100 +	39·5	1 + br
64·4	2 + br	91·15	1 +	32·02	100 +	47·8	2 + br
78·6	2 + br	99·8	2 + br	36·4	2 + br	58·60	300
83	2 + br	2804	2 + br	44·6	2 + r	4916·7	50
2524	1 + br	05	2 + br	3305·3	1 +	60·3	30
34·90	10 +	20·2	3 +	41·80	50	5021·1	1 + br
36·72	30 u	47·86	2	51·7	2 +	46·3	1 + br
40·35	3 u	57·20	2 +	90·8	5 + br	5366·1	2 + br
76·6	3 + r	93·88	50	3543·6	3 + br	5405	1 + br
2642·5	2 + br	2925·80	20 r	61·35	3 + r	27	1 + br
48·2	1 + br	67·48	200 u	3650·32	100 + u	60·95	500 u
52·28	20 +	3007	2 + v	54·96	30	5769·6	300
53·90	8 + br	11·3	1 + br	63·22	50 u	90·3	300
55·30	4 +	21·7	200 + br	80·7	1 + br	5804·7	5 + br
58·3	1 + br	24·1	30 +	3751·9	1 + br	19	1 + br
60·3	1 + br	27·7	3 +	3984·12	5	90·3	1 + br
86·7	1 + br	38·68	2 +	4046·89	100	6123·6	1 + br
2700	1 + br	51	1 + br				

XXXI. J. Jod.

Ältere Messungen: Fehlen.

Material: Jod und Jodkalium auf Gaskohle.

Linienzahl: 0.

XXXII. In. Indium.

Ältere Messungen: H. Kayser und C. Runge, Berl. Akad. (1892).

Material: Indiumchlorid von E. Merck, auf Gaskohle.

Verunreinigungen: Ga.

Linienzahl: 28.

2306·17	2	2710·38	10 u	2932·75	10	3256·22	100 u
40·35	1 + br	14·01	3	57·14	2 u	58·68	20 u
2460·24	1	53·99	3 u ¹⁾	3039·46	30 u	61·20	2 Cd?
68·20	1 +	75·46	1	51·19	1	3610·65	1 Cd?
2521·41	5 + u ¹⁾	2837·01	3 u ¹⁾	51·31	1	4008·99	1 + u
60·24	10 u	58·19	1	66·42	1 u	4101·95	200 u
2601·90	3	58·30	1	3186·92	1 +	4511·55	300 u

¹⁾ Rote Komponente stärker.

XXXIII. Ir. Iridium.

Ältere Messungen: H. Kayser, Berl. Akad. (1897). J. M. Eder und E. Valenta, Wiener Akad. 119 Ha. (1910) (Rot).

Material: Metall von Heraus.

Verunreinigungen: Pd, Pt, Rh, Ru.

Linienzahl: 806.

Zwischen den Wellenlängen 3528–3589, 3707–3902 und 4050–4616 wurden die Aufnahmen auf Kupferelektroden gemacht, sonst auf Gaskohle.

2242.80	2	2409.46	1	2493.16	2	2572.47	1
53.60	1 +	10.26	1	96.36	1	72.79	2
55.22	1	10.82	1	2500.36	1	77.35	3
59.00	1	15.95	1	02.72	2	78.78	1
64.73	1	18.18	2	03.08	3	79.00	1
95.19	1	24.40	1	04.44	1	83.26	1
2300.11	1	24.74	1	05.82	1	86.14	1
04.30	2	25.01	1	06.70	1	92.15	3
05.54	1	25.07	1	07.70	1	95.93	1 +
09.00	1	25.75	1	08.42	1	99.15	3
15.46	1 +	26.61	1	09.80	1	2602.15	1
21.49	1	27.71	2	12.02	1	04.64	1
21.61	1	31.34	2	12.66	2	07.60	2
33.37	1	32.04	2	13.80	2	08.30	3
33.95	1	32.41	1	15.45	1	11.40	3
34.57	1	32.64	1	24.99	1	12.13	1
43.25	2	36.50	1 +	25.16	1	12.35	1
43.68	2	45.39	1	29.56	2	14.27	1
55.11	1	47.53	1	32.29	1 +	15.06	2
56.68	1	47.84	1	32.63	1	16.00	1
58.25	1	48.30	1	33.24	3	16.08	1
60.80	1	49.10	1 +	34.55	3 (Fe)	17.86	3
63.14	2	52.89	2	37.30	2	20.00	2
67.12	1 +	54.20	1	37.78	1	23.75	1 +
68.11	2	54.67	1 +	40.49	1	25.43	2
72.86	3	55.69	2	41.56	1	26.85	2
73.23	1 +	55.95	1	42.11	2	29.49	1
75.21	1	57.12	1	44.08	4	34.33	3
79.45	1	57.31	1	45.62	1	35.35	2
81.72	1	62.47	1	47.26	1	39.06	1
81.86	1	63.10	1	47.76	1	39.51	2
86.67	1	64.96	1	51.50	2	39.80	4
86.98	2	65.16	1	54.47	2	40.45	1
90.71	2	67.37	2	55.95	1	44.28	2
91.29	3	67.45	1 Pt?	63.36	1	46.35	1
94.41	1 +	75.19	3	64.27	2	52.60	1
2401.86	1	78.20	1	69.97	2	52.76	1
03.14	1 (Pt)	81.27	3	70.70	1	53.13	1
07.66	1	85.46	1	72.16	1	53.86	2

2	2740.08	1	2836.21	1	2930.30	1
2	40.16	1	36.51	4	30.75	2
1	40.22	1	37.42	3	33.25	1
5	44.09	3	39.32	6	34.76	8
3	47.62	1	40.35	4	35.30	1
2	56.20	1	41.80	1	36.20	1 +
5	58.33	2	42.40	2	36.85	8
1	59.11	1 +	49.86	8	38.60	3
1	59.42	2	51.56	1 +	38.87	1
2	60.00	2	51.65	1 +	39.40	3
1	67.47	1	53.43	1	40.66	3
4	67.76	1	55.96	1	41.20	2
4	71.76	3	56.03	1	43.30	10
3	72.58	3	57.05	1	47.10	3
2	74.05	1	60.77	2	47.48	1
2	74.73	1	62.49	1 +	49.89	3
1	75.09	1	62.60	1	50.61	1
1	75.65	3	63.95	3	50.89	2
1	77.55	2	66.76	2	51.35	8
2	80.55	1	68.70	1	61.03	1
1	81.07	1	69.80	2	61.59	1
3 v	81.42	4	73.46	2	63.11	2
1	85.33	3	75.10	1	65.34	2
1	94.20	1	75.72	4	66.24	1
5	96.55	2	76.10	4	68.32	1
1 +	97.45	4	77.79	4	68.60	1
1	97.82	5	79.51	3	69.07	1
1 +	98.29	4	80.29	1	71.20	1
2	99.84	1	81.30	2	74.24	2
1	2800.91	3	82.77	5	74.66	1
1 +	06.50	1	83.55	1	75.07	3
1	07.75	1	97.07	1	77.80	1
1	10.65	1	97.27	5	80.80	4
3	12.91	1	99.74	2	82.55	1
1	14.52	1	2900.50	1	85.94	3
2	15.00	1	02.09	3	90.77	3
2	17.04	1	04.93	4	96.20	4
2	23.34	4	05.75	2	97.31	2
1	24.59	6	07.36	3	97.54	3
1	27.27	1	09.66	2	3000.15	1
2	29.73	1	12.36	1 Pt?	03.78	4
2	30.57	2	16.49	4	05.33	2
5 ¹⁾	31.46	1	17.86	1	10.03	2
1 +	31.93	1	18.69	3	11.84	3
2 ²⁾	33.35	2	24.94	10	12.71	1
1	33.75	3	27.14	1	16.55	3

umt auch in Pt und Pd vor.

umt auch in Pt vor.

3017-43	4	3114-69	3	3217-70	1	3305-80	4
19-35	3	17-64	1	18-60	4	05-99	1
20-12	3	20-90	5	19-66	6	07-78	1
22-54	2	21-91	4	20-91	15	08-57	1
22-81	1	22-50	3	21-40	4	09-55	1
25-99	3 ¹⁾	22-82	1	23-65	1	10-69	5
29-50	5	24-20	1	24-06	1	11-16	1
32-55	2	28-51	3	26-83	2	12-31	4
33-75	2	33-23	3	29-40	5	16-80	2
34-66	1	33-45	8	30-90	4	17-45	1
37-86	3	33-89	1	32-14	3	18-60	1
39-38	5	36-56	1+	40-35	3 ¹⁾	19-25	1
40-58	2	39-70	1	40-69	4	22-77	5
47-27	5	40-52	3	41-65	6	23-03	4
49-52	5	45-17	3	42-47	1	25-58	1
51-25	1	47-85	1	42-78	1	26-25	1
52-30	2	50-76	4	45-02	1	27-04	2
53-70	2	51-75	1+	49-63	2	34-35	6
57-40	4	54-66	3	49-87	3	36-21	1
60-96	2	54-85	3	54-54	4	38-56	5
61-53	2	56-28	1	55-20	2	39-56	4
64-65	2	57-60	1	56-92	2	39-70	1
65-27	1	59-29	4	62-15	5	40-50	3
69-00	5	59-64	1	62-85	1	43-55	1
69-18	4	61-49	1	63-09	1	44-36	2
69-82	3	61-95	1	63-44	1	46-61	1
73-42	1	66-85	1	66-59	10	47-72	2
74-87	2	67-30	3	67-22	1	53-00	2
76-80	3	68-30	4	71-38	4	53-70	1
77-75	2	69-01	6	71-94	3	55-95	2
78-00	1	71-80	2	74-68	2	59-03	2
78-70	1	72-91	3	75-15	1	59-90	3
83-37	4	77-70	4	75-45	1	60-00	1
86-58	4	78-80	1	75-74	2	64-40	2
88-15	5	79-32	3	76-28	1	65-69	1
90-29	2	80-48	4	77-41	5	67-09	2
94-14	2	89-47	1	78-41	1	67-21	2
94-49	1	98-23	1	81-85	1	68-64	10
97-94	1	99-06	5	82-46	1	69-14	1
99-05	1+	3200-16	1+	84-69	2	70-78	3
3100-50	15	01-02	2	87-20	4	71-60	4
01-29	1	05-22	3	87-72	5	72-96	1
03-88	1	07-22	1	95-24	2	74-61	1
08-67	1	08-27	2	97-65	2	76-15	1
09-49	1	12-22	4	3303-24	1	80-01	1
12-48	1	12-37	4	03-78	2	81-18	3
14-16	3 Pd?	13-68	3	05-07	2	83-91	1

1) Kommt auch in Pt vor.

Bogen

La

4570.20	3	4753.30	1 +	5047.05	1	54
71.15	1	57.30	1 +	50.75	2	
75.02	8	59.90	1 +	56.65	2	
80.22	3	67.07	3	63.10	1	
81.38	1	70.60	2	68.08	1	
96.37	1	75.32	1	80.40	1 +	6
4602.21	1	80.10	1	5106.40	3	6
04.44	1	91.59	1	14.70	4	
05.26	1	94.80	1	21.03	1 +	8
05.95	3	96.89	2	23.12	4	8
13.54	5	4800.20	1	45.59	3	9
15.25	1	00.46	1	56.89	2	9
20.03	4	04.22	4	57.58	2	53.0
36.60	1	09.19	4	58.83	2	0
43.30	1	17.40	1 + d	63.77	2	0
45.43	3	24.24	5	67.90	1	0
46.51	1	27.06	1	74.01	1	0
47.66	2	30.73	1	77.48	3	1
48.82	2	39.71	2	83.60	3	1
50.51	1	40.21	2	84.09	1	33
52.30	2	43.5	1 + br	88.40	2	33
55.66	5	50.81	2	5204.31	2	33
60.85	1	51.02	2	12.01	3	4
62.69	5	55.17	1	26.40	1 +	4
63.92	4	61.09	5	34.46	3	47
69.08	4	70.77	1	39.73	1	62
71.98	3	79.05	1	41.00	1	62
88.84	1	87.83	1	53.65	1	63
91.34	3	4900.10	5	58.09	3	63
92.67	4	02.06	1	59.57	1	77
99.80	2	05.34	1	71.10	3	82

5720.24	2	5892.92	1 +	6134.64	1 +	6390.70	10
27.53	1	95.05	2	43.25	1 +	94.46	15
35.20	2	5902.22	1	45.6	1 + br	99.24	3
40.90	4	04.59	1	46.77	1	6411.24	10
43.20	1 +	17.90	2	62.47	1 +	46.85	1
44.67	4	28.00	1	65.99	2	48.37	2
62.08	3	28.77	1	72.95	1	50.59	1
69.35	4	30.92	5	88.30	1	54.78	8
69.56	3	35.57	3	6203.75	1 +	56.24	8
70.21	3	36.50	3	18.40	1 +	68.7	1 + br
89.47	5	48.6	1 + br	33.75	1 +	85.80	1
91.58	8	60.88	1	35.10	1 +	98.43	2
97.81	4	62.90	1 +	36.48	1 +	6506.45	1 +
5805.99	4	71.35	1 + br	37.04	1 +	20.95	1 +
08.56	2	73.79	2	38.82	1 +	27.21	10
22.23	3	76.00	1 +	50.14	15	43.40	10
24.09	2	82.63	1	62.52	15 d	65.71	1
27.82	1 +	92.65	1 +	66.27	3	78.79	4
29.99	2	6007.62	2	88.0	1 + br	93.75	2
40.00	1 +	38.86	2	88.8	1 + br	6600.44	1
45.29	1	67.40	1 +	93.81	3	08.55	1
48.63	2	69.00	1	96.32	5	16.86	2
52.53	1	85.25	1 +	6305.71	1	44.7	1 + br
55.85	2	6100.64	2	10.39	1	51.12	1
63.95	3	07.53	1	11.15	1	61.64	1
73.26	1	04.75	2	18.48	1	71.7	1 + br
75.00	1	11.96	1	20.59	5	93.14	1
77.90	1	26.31	3	26.10	4	6709.75	2
78.28	1	27.30	1	58.33	1	53.33	1 +
80.90	3	29.79	3	60.42	1	74.52	1

2741·37	10 u ¹⁾	3986·2	1 + br	4602·20	100 + u	61
3232·83	50 u ¹⁾	4132·3	5 + br	03·17	100 + u ²⁾	62
3794	1 + br	4273·55	5 + br,r	4972·10	10 r	67
3915	2 + u,br					

XXXVII. Mg. Magnesium.

Ältere Messungen: H. Kayser und C. Runge, Berl.

J. M. Eder, Denkschr. d. Wiener Akad. 74 (1904).

Material: Metall auf Gaskohle.

Verunreinigungen: Al, Pb.

Linienzahl: 52.

2673	2 + br	2795·64	200 u	2936·70	3 +	3838
98·5	1 + br	98·10	2	37·00	3 + r	4059
2733·7	1 + br	2802·82	100 u	38·70	3 + r	4167
36·8	1 + br	09·9	2 +	42·22	3 + r	4352
65·5	1 + br	11·2	1 +	3074·20	2 +	80
68·6	1 + br	12·0	1 +	91·20	15 u	4571
76·82	20 u	15·8	1 + br	93·14	20 u	4703
78·40	20 u	17·2	1 + br	97·08	30 u	30
79·95	30 u	47·1	2 + br	3330·09	5	5167
81·51	20 u	48·7	3 + br	32·31	8	72
83·08	20 u	52·25	500 u	36·83	10	83
90·97	5	2915·62	10	3829·51	30	5528
95·01	2 u	28·9	2 +	32·49	50	5711

XXXVIII. Mn. Mangan.

Ältere Messungen: B. Hasselberg, Stockholm Akad.

2584·41	2	2710·42	1	2806·92	1	2919·23	1
· 92·40	1	13·42	5 + -	08·12	2	20·60	1
93·04	2	26·22	5 + -	08·49	1	23·35	1 +
93·82	4 u	29·48	1	09·20	2	23·85	1 +
95·85	3 -	34·83	1	11·27	1 +	24·55	1
98·25	1	38·95	1	11·48	1 +	25·67	8 -
99·97	1	42·83	1	12·99	2	28·79	2
2600·33	1 +	43·50	1 +	13·60	2	30·35	2
02·23	1	44·39	1	14·09	2	33·19	3
05·78	4	45·64	1	15·13	1	34·13	2
10·26	1	47·86	1	15·71	1	35·75	1
12·94	1 -	52·40	1	17·26	1	36·25	1
13·65	1	54·00	1 + d	17·77	1	38·00	2 +
15·97	1	59·08	1	18·09	3	39·40	3
18·22	2	61·03	3	18·85	2	40·01	1
18·50	1	63·76	1	19·00	2	40·50	8 -
19·01	2	64·00	1	19·46	1	41·15	2
19·60	2	67·58	1	19·83	1	41·80	1
20·09	2	71·55	2	21·58	2	42·85	1
23·01	2	73·80	1	22·68	2	44·53	1
23·42	2	76·25	2	23·40	1	49·31	3
24·15	2	77·57	1	24·5	2 + br	53·15	1
24·93	2	78·68	2	26·8	2 + br	57·07	1
26·74	2	80·14	2	28·87	1	63·75	1
30·35	1	82·85	2	30·92	2	64·25	1
30·66	2	83·21	1	36·43	1	78·68	1
32·46	1	86·35	1	37·00	1 +	86·14	1
38·26	1	87·94	1	42·24	1 +	3002·72	1 +
48·9	1 + br	88·78	1	58·85	2	07·80	1
55·85	1	89·30	2	68·99	1	08·35	1 +
58·00	1 + -	89·46	2	72·68	2	11·30	1
70·30	1 + -	89·85	1	79·60	1	11·52	1
			1	82·01	1	14·82	1

240.53	2 —	3433.70	1	3605.84	1
40.75	2 —	39.13	1	07.69	5
43.93	3 —	42.13	2	08.66	5
47.80	1	50.73	1	10.49	5
48.64	3 —	55.10	1 +	15.53	1
51.27	2 —	60.45	2	19.42	4
53.09	3 —	62.88	1	23.96	4
54.14	2 —	63.79	1	29.89	3
56.25	3 —	65.34	1	35.82	1
58.52	3 —	70.16	1	40.24	1
60.40	3 —	74.20	1	41.56	1
64.83	3 —	74.27	1	58.07	1
67.90	1	83.22	2	58.68	1
68.83	1	88.43	1	60.58	2
70.49	1	88.80	2	69.55	1 +
73.15	1	95.99	1	70.00	1
78.65	2 —	96.96	1	70.67	2
80.90	2	97.66	1	77.13	1
91.10	1	3511.97	1	80.26	1
96.00	1	24.70	1	82.23	1
96.16	1 —	31.94	3 —	84.67	1 +
97.01	2 —	32.20	20 u 14 —	85.01	1 +
98.35	2	35.40	1	85.36	1 +
3301.10	1	38.13	1	92.96	1
03.40	2	47.91	10 u —	93.83	2
05.06	1 +	48.18	10 u —	94.27	1
07.12	1	48.33	3	96.70	2
08.91	1 —	52.90	1	3700.47	1 +
12.05	2	59.93	1	01.88	2
13.41	2 +	69.61	15 u —	06.23	2
13.70	2	69.95	10 u —	06.81	1 +
14.59	2 +	70.17	4 —	19.06	2
15.07	2 +	76.25	1 + br	32.05	2
16.47	1 +	77.99	10 —	41.19	1 Ti?
16.61	1 +	79.74	1	46.77	1
17.47	3 +	80.3	1 + br	50.90	2
20.82	2	82.54	1	56.77	1
30.80	2	83.79	1	63.50	1
43.85	1 —	85.46	1 +	67.83	1
45.47	1 —	86.69	5 —	68.30	1 +
51.57	1 —	90.15	1	74.82	1 +
51.89	1	91.05	1	78.67	1

Mn

B

2	3929.79	1	4045.31	3	4147.71	2
2	36.91	1	48.90	8	48.96	2
1	43.05	2 +	49.10	2	55.65	1
10 d?	52.12	1	49.56	1	57.12	1
1	53.00	2	51.90	1	76.73	2
1	76.05	1	52.61	2	90.16	2
1	77.25	1	55.36	1	4201.90	1
5	80.33	1 +	55.70	4	11.90	1
2	81.05	1 +	58.10	3	15.13	1
3	82.32	1	59.09	4	20.79	1
5	82.73	2	59.54	3	35.41	1
4	83.06	1	61.90	4	39.90	3
3	84.34	1	63.70	5	57.83	3
1	85.40	2	65.22	2	61.48	1
4	86.98	2	66.89	1	66.10	3
8	87.26	2	68.17	2	78.82	1
1	87.63	1	70.48	4	81.30	3
1	88.85	1 +	75.40	1	84.25	2
4	89.97	1	79.38	3	4300.35	2
5	90.14	1	79.61	3	01.2	1
3	91.85	1	83.11	4	05.82	1
1	92.65	1	83.37	1 +	12.71	4
1	97.36	1 +	83.82	3	14.60	1
1	4001.34	1	90.11	2	20.50	1
1	02.07	1	90.76	1	21.31	1
1	02.31	1	92.55	1	23.57	1
1	03.44	1 +	95.24	1	26.34	1
1	08.16	1	95.41	1	28.12	1
1	11.68	1	4103.14	1	28.80	1
1	12.05	1 +	03.64	1	29.60	1
1	16.80	1	05.51	2	36.07	1
1	18.28	10 —	08.00	1	37.55	2
1	20.22	1	11.02	2	38.40	1
1	26.07	1	13.41	1	39.01	1
1	26.58	3	14.04	1	56.30	1
1	28.74	1	14.54	1	56.76	1
1	30.92	100 u ¹⁾ —	16.75	1 +	59.90	1
1	31.95	2	22.58	1	69.05	1
1	33.21	100 u ¹⁾ —	22.96	1	71.07	1
2	33.72	3	23.49	1	75.11	1
2	34.62	50 u ¹⁾ —	23.71	1	77.37	1

24	2	4529.95	1	4619.45	1	4816.3	1	+	br
66	2	32.48	1	49.78	1	47.4	1	+	br
04	3	34.61	1	20.4	1	18.60	1		
04	10	38.62	1	21.2	1	23.71	1		
41	1	41.43	1	22.90	1	20.79	1		
93	3	42.61	2	23.50	1	27.08	1		
90	1(Fe)	44.59	2	24.50	1	38.47	2	+	
40	1	45.47	1	25.6	1	40.39	1		
23	2	47.53	1	26.69	1	43.39	1		
52	8	48.71	3	27.44	1	44.01	2		
00	1	49.90	1	27.92	1	54.77	1		
05	1	50.0	1	42.50	1	54.99	1		
30	2	53.5	1	42.99	2	62.90	2		
61	1	60.70	1	45.20	1	84.80	1		
78	8	61.3	1	49.20	1	89.00	1	+	
68	1	62.9	1	56.40	1	100.00	1		
19	5	63.8	1	57.70	1	67.95	1		
20	5	64.2	1	58.60	1	42.56	1		
51	5	65.9	1	59.01	1	52.08	1		
02	5	71.38	1	59.57	1	66.06	3		
22	4	71.71	1	60.98	1	74.39	1	+	
76	5	72.56	1	62.41	1	86.90	1		
48	6	72.91	1	63.85	1	90.64	2		
59	3	73.15	1	66.75	1	103.50	1		
30	5	73.30	1	71.89	3	17.77	1		
20	10	74.67	1	97.09	1	29.99	1		
38	8	75.56	1	4701.31	3	30.81	1		
33	8	77.43	1	99.89	2	12.77	1		
98	8	78.20	1	12.20	1	74.22	1	(Fe)	
59	1	79.83	2	13.3	1	86.95	1		
54	2	82.03	1	14.54	1	103.74	1		
0	1	82.95	1	27.70	8	18.10	2		
27	5	83.26	1	30.50	1	49.29	1		
51	2	85.10	1	39.30	5	51.10	2		
9	2	86.30	2	54.24	30	96.46	3		
0	1	91.7	1	61.73	6	97.40	1		
7	1	91.9	1	62.60	10	125.48	4		
9	8	94.28	1	66.08	6	60.91	1		
0	8	95.51	2	66.63	8	89.61	1		
0	1	96.60	1	71.88	1	98.10	1		
0	1	99.14	1	74.30	1	99.02	1		
2	2	4605.52	3	79.30	1	6309.10	1		
3	1	96.56	1	83.62	30	17.26	1		
0	1	97.80	1(Fe)	96.90	1	21.46	2(Fe)		
5	1	112	1	br	97.85	1	41.25	15(Fe)	
5	1	116	1	br	98.5	1	44.60	2	
9	1	1430	1	br	4807.31	1	48.22	1	
1	1	1580	1	br	98.91	1	10.05	2	

9	1+	5470.88	10 -	5589.03	1	6013.74	20 -
7	1+	81.61	8 -	94.75	1+	14.58	1
65	1+	96.11	1	5602.29	1+	16.90	30 -
58	1+	97.57	1	26.50	1+	22.05	30 -
45	1	5504.41	1	98.6	1+	57.37	1
86	10	06.10	8 -	5700.75	1+	78.6	1+
72	2	13.30	1	18.4	1+ br	6122.4	1+
89	8 -	14.95	1	20.42	1+	62.35	1
70	10	17.00	10 -	24.0	1+ br	6265.85	1
80	1+	20.70	1	26.05	1+	6332.42	1
67	10 -	33.30	1+	38.48	2	44.30	1
90	8	36.69	1+	41.65	1+	49.94	1
61	10 -	37.99	10 d?	80.39	2	55.29	1
40	1	52.20	3	82.4	1+ Cu ?	79.18	1
40	1+	52.68	1+	93.1	1+	82.40	1
75	8 -	56.02	1	5817.01	1	84.88	1 Ni?
65	2	68.02	3	35.55	1+	6413.77	1+
90	1	73.24	2	49.11	1	41.14	1
64	3 -	73.93	3	5948.7	1+ br	91.92	2
87	1	75.50	1	74.11	1	6605.7	1+

XXXIX. Mo. Molybdän.

Messungen: B. Hasselberg, Akad. der Wiss. Stockholm (1902).
und Astroph. J. 17 (1903) J. M. Eder und E. Valenta, Wiener Akad. 119
a (1910) (Rot).

Material: Metall von C. Schuchardt, auf Gaskohle.

Reinigungen: Ag, Cu, Mn, Sn, V, Wo.

Zahl: 3390.

07	1	2349.88	1	2398.17	1+	2454.1	1+
39	1	51.39	1	2403.69	1	54.3	1+
06	1	52.69	1	05.95	1	55.05	1
62	1	54.58	1	08.49	1	57.50	1
85	1	55.32	1	15.40	1	57.68	1
30	1+	64.50	1	16.63	1+	58.80	1
02	1	72.18	1+	16.95	1+	65.65	1
12	1+	72.37	1	20.35	1	69.16	1
58	1	73.20	1+	20.63	1	72.05	2
03	1	80.53	1	20.79	1	74.78	1
26	1+	83.60	1	29.70	1	81.89	2
36	1+	87.25	1	30.53	1	85.38	1
79	1	89.30	1	30.65	1	97.70	1
55	1	94.85	1	37.79	1	97.85	1
47	1	95.34	1	44.3	1+ br	97.97	1
63	1	97.68	1+	53.4	1+	98.37	1

1	2601.47	1	2656.54	1	2712.04	1 +
1	01.80	1	56.63	1	12.80	1 +
1	01.90	1	58.18	2	13.17	1 +
1	02.90	1	58.98	1	13.57	1
1	03.42	1	60.67	2	15.24	1
1	05.17	1	62.92	1	15.65	1 +
1	07.48	2	63.44	1	17.20	1
1	08.97	1	65.18	2	17.40	1
1	10.35	1	65.59	1	17.84	1
1	11.30	2	66.84	1	18.73	1
2	11.75	1	70.41	2	20.26	2
1	12.41	1	71.5	1 +	24.49	1 +
1	13.20	2	71.99	1 +	25.23	2
1	13.84	1	72.95	2	26.04	1
1	15.47	2	73.36	2	26.71	1
2	16.02	1	73.94	1	27.05	1
1	16.85	2	78.75	1	28.40	1
1	17.92	1	79.93	3	28.79	2
1	19.43	1	81.50	1	29.20	2
1 +	20.95	1	81.65	1	29.75	2
3	21.19	2	82.72	1	32.94	2 v
1 +	27.65	2	83.34	2	33.31	1 +
1	28.81	2	84.24	2	33.46	2
2	29.03	1	85.70	1 +	33.90	1
1	29.94	2	86.02	1 +	35.21	1
1	31.59	1	88.08	2	35.74	1
1	34.84	1	88.73	1	35.95	1
1	34.94	1	89.28	1 +	36.99	1
1	35.29	1	90.84	1	37.39	1
2	35.66	1	91.93	1 +	37.95	1
3	36.75	2	92.28	1 +	41.05	1
1	37.45	1 +	92.74	1 +	42.47	1
1	37.58	1 +	93.16	1	42.72	1
2	38.40	2	93.65	1	43.15	1
1	38.83	2	96.15	2	43.25	1
2	39.44	1	97.90	2	43.79	2
1	40.37	1	99.18	1	45.17	2
1	41.11	3	2700.30	2	45.46	2
2	43.89	1	00.83	1	46.41	1
1	44.43	2	01.16	2 d?	46.96	1
1	45.86	1	01.53	2	48.56	1
1	46.56	2	02.72	1	50.25	1
2	47.34	1	02.88	1	50.90	1 +
1	49.33	1	03.10	1	51.59	2
1	49.56	2	05.33	1	52.26	1
1	50.78	1	06.20	2	54.45	1
1	53.45	2	09.33	1	55.46	1
1	55.13	3	09.62	1	56.21	1
1	56.00	1	10.84	1	56.36	1

0	1	2808.49	2	2849.44	2	2894.59	2
0	1	09.50	1	50.89	1	95.10	1
6	1	10.05	1	50.96	1	96.56	1
7	1+	10.53	1	51.29	1	97.07	1
9	1	10.76	1	53.01	1	97.74	1
2	1	11.60	1	53.28	1	98.49	1
2	2	12.2	1+	54.95	1	98.76	2
3	2	14.15	1+	56.15	1+	99.15	1+
2	2	15.64	1	56.50	1+	2900.46	1+
2	2	15.99	1	56.65	1+	00.87	1+
2	2	16.27	2	56.90	1+	02.34	1
1	1	17.02	1	59.21	1	02.73	1
2	2	17.56	2	59.64	1	03.18	1
1	1	18.39	1	60.50	1+	05.36	2
1	1	20.75	1	62.90	1	06.15	2
1	1	22.17	1	63.90	1	07.21	1
1	1	22.55	1	64.39	2	07.60	1
1	1+	22.97	1	64.74	2	07.88	1
1	1	23.39	1	65.18	1	08.26	1
1	1+	24.50	1	65.67	1	09.20	2
2	2	25.76	1	66.74	1	11.87	1+
1	1	26.11	1	67.12	1	12.00	2
2	2	26.30	1+	69.67	2	13.61	2
1	1+	26.63	2	70.26	1	15.36	1
2	d?	26.81	1	71.01	1	15.46	1
2	2	27.83	1+	71.28	1	16.19	1
2	2	28.05	1+	71.60	2	18.49	1
1	1	28.88	1	71.98	1	18.95	1
1	1	29.90	1	72.95	1+	19.30	1
1	1	30.00	1	73.74	1	19.47	1
2	2	31.10	1	76.61	1	22.00	1+
1	1	32.10	1	76.98	1	23.51	2
2	2	34.51	1	78.45	1	24.40	1
2	2	34.88	1	79.14	1	24.88	1
1	1	35.45	1	81.82	1	25.48	1
1	1	36.01	1	82.66	1	30.54	3
2	2	36.09	1	84.70	1+	31.20	1
2	2	37.07	1	85.86	1	32.20	1
1	1	37.44	1	86.70	2	34.40	2
1	1	38.01	1	87.72	1	34.96	1
2	2	38.61	1	88.64	1	35.28	1+
1	1+	39.68	2	88.73	1	36.59	1
2	2	41.37	1	89.98	1	37.75	1
1	1	42.25	2	90.6	1+	38.87	1
1	1	42.48	2	91.12	2	40.14	1
1	1+	43.00	1	91.40	1	41.09	1
1	1+	43.83	1	92.70	1	42.97	1
1	2	44.50	2	92.97	1	44.81	1
2	2	48.31	2	93.36	1	45.50	1

2	3003-29	1	3061-07	1	3099-66	1
2	04-26	1	61-71	2	3100-04	2
1	07-80	1+	62-55	1	01-00	2
1	08-23	2	64-40	3	01-45	3
1	09-75	1+	64-6	1+	02-00	1
1	10-39	2	65-18	3	04-02	1
1+	11-66	1	66-50	1 Va?	04-15	1+
1	13-51	2	68-11	2	04-51	1
1	13-90	3	68-75	1	06-46	2
1+	14-80	2 d?	69-13	2	07-00	1
1	16-88	2	69-61	1	07-35	1
1	23-12	2	69-90	1	08-10	1
1	23-80	1	70-09	1	08-20	1
1	25-11	2	71-03	2	10-75	1
1	27-86	1	71-55	2	11-34	1
2 (Fe)	31-30	1	73-50	1	12-23	5
1	32-65	1+	74-50	3	13-12	1
1	33-35	1+	75-05	1	13-8	1
1	33-60	1+	75-75	1	15-00	1
1+	35-05	1+	76-96	1	15-43	1
1	35-44	2	77-50	1	15-83	1
1	36-40	2	77-78	1	16-18	1
2	38-87	1	78-10	1	16-80	1
1	39-91	2	78-37	1	17-64	1
1+	41-81	3	80-00	2	18-89	1
1+	43-06	1	80-52	2	19-93	1
2	43-14	1	81-27	2	20-85	1
1	43-80	1	82-06	1	22-14	1
1	43-97	1	84-35	1	22-87	1
2	44-80	1	85-71	3	23-16	1
1	45-13	1	86-47	1	23-49	1
1	45-30	1	86-98	1	23-73	1
2	46-90	2	87-73	2	25-15	1
2	47-16	1	88-44	1	27-13	1
2	47-40	2	89-24	2	28-98	1
2	47-94	1	89-84	2	29-45	1
1	49-43	1+	90-76	1	31-33	1
1	50-33	1+	91-96	1	32-70	30 n
1	52-65	1	92-21	2	33-95	1
1+	53-13	1	92-83	2 (Al)	34-63	1
1	53-40	1	93-49	1	35-69	1
1	53-74	1	93-80	1	36-00	2
1	55-40	2	93-93	1	36-52	2
1	55-84	1	94-80	3	36-86	2
1	56-82	1	95-81	1	37-95	1
1 Fe?	57-66	2	97-31	2	38-45	1
1	58-69	1	97-50	1+	38-80	1
2	59-80	1	98-57	1	39-97	2
1	60-89	1	99-07	1		

2	3183.15	2	3219.63	1 +	3260.33	1
1	83.44	1	21.01	2	60.65	2
1	84.17	1 +	21.89	2	61.33	1
2	84.55	1 +	23.64	2	61.96	1
1	84.71	2	24.55	1	62.80	3
1	85.23	2	26.91	1	63.20	1
2	85.82	2	28.36	3	63.99	2
2	86.49	1	28.82	1	64.59	3 d?
2	87.39	1	29.06	1	65.29	2
3	87.77	2	29.93	3	66.32	2
1	88.20	2	30.65	1	66.45	2
1	88.51	2	30.92	1	67.26	2
2	89.37	1	31.25	1	67.77	1
1	89.88	1	32.40	1	68.33	2
2	90.36	1	32.75	1	71.04	3
2	91.15	1	32.87	1	71.79	1
2	91.64	1	33.33	4	73.00	1
1 +	92.24	1	34.30	1	73.20	1
10 u	92.92	2	35.00	1	75.70	1
1	94.11	20 u	35.54	2	76.17	1
2	94.99	1	36.00	1	76.49	1
1	95.33	1	36.54	1	76.95	1
1	96.09	2	37.21	4	77.26	1
1	96.70	1	38.13	2	78.76	1
1	97.30	1	39.86	1	79.57	2
1	98.53	1	40.63	2	80.41	1
1	98.99	2	40.82	1	81.20	2
2	3200.32	2	41.56	1	81.49	1
3	00.82	1	44.62	2	82.60	1
1 +	01.02	2	45.07	1	83.50	2
1 +	01.60	1	46.09	2	84.38	1
1 +	02.23	2	46.45	1	84.71	1
1	05.39	2	47.76	3	85.16	2
1	05.70	2	49.33	1	85.50	2
20 u	06.08	3	50.09	2	86.12	1
1	08.98	10	50.90	1	86.81	1
1	10.51	1	51.49	1	87.08	1
2	10.77	1 d	51.81	2	87.34	1
2 d?	11.12	2	52.08	1	87.54	2
1	11.66	1	53.67	1	87.90	1
3 d	12.76	2	53.94	1	89.12	4
1	13.47	2	54.83	2	90.00	3
2	14.59	2	55.27	1	90.58	1
2	15.20	2	55.92	1 +	90.99	4
2	15.42	1	56.34	3	91.74	2
2	16.57	1	56.85	1	92.45	2
1	16.90	1	58.83	1	93.82	2
1	18.65	2	59.30	2	94.00	1
1	19.40	1	59.69	1	95.00	2

1	3329.28	1	3367.75	1	3404.50	4
2	31.54	2	68.10	1	04.99	1
2	32.80	1	68.26	1	05.33	1
1	33.06	1	69.38	2	05.75	1 +
1	33.48	1	70.07	1	06.10	5
1	35.11	1	72.20	1	07.44	1
1	35.22	1	73.05	1	07.73	1
1	35.64	1	73.27	1	08.75	1
1	36.20	1	73.95	2	09.96	1
1	36.66	2	74.74	1	11.23	1
1 +	37.58	1	74.85	1	12.16	1
1	38.26	1	74.95	1	12.43	1 +
3	38.57	1	75.35	2	13.50	2
1	39.50	1 +	75.76	2	13.81	2
3	40.34	3	76.88	1	14.24	1 +
3	42.02	1	77.05	1	14.91	1 Ni?
3	43.91	2	77.75	1	15.04	1
2	44.90	6	78.31	2	15.40	1
3	45.69	1	78.59	2	15.75	1
1	46.55	1	80.20	5	16.16	1
1	47.17	6	81.26	1	16.26	1
1	47.92	1	81.93	1	16.70	1
2	48.20	1	82.45	2	16.80	1
1	49.33	2	82.66	4	17.63	1
2	50.16	1	83.71	1	18.48	1
1	50.50	3 d	84.80	6	18.69	3
1 +	51.28	1	85.36	1	19.09	2
1	51.67	1	86.00	2	19.82	1
1	53.50	1	87.90	2 d	20.21	3
1	53.65	1	88.33	1	21.41	3
1	54.26	2	88.56	1	21.95	1
1	54.63	1	88.85	1	22.47	2
1 +	54.93	1	89.05	1	23.15	1
2	55.15	3	89.92	2	23.45	1
2	56.50	1	90.25	1 +	24.74	2
1	57.82	1 +	91.20	1	24.92	2
1	58.26	8	91.67	1	25.32	2
1	59.34	1	92.31	2	25.64	2
1	59.66	1	93.80	2	26.15	2
1	61.52	4	95.75	1	26.93	2
4	61.99	1	96.70	1	27.65	1
1	62.51	3	96.96	1	28.05	2
1	62.90	1	97.10	1	28.99	1
4	63.98	8	97.83	2	30.36	1
1	64.98	1 +	99.03	1	31.81	1
4	65.51	1	3400.26	1	33.05	2
1	65.68	1	02.41	1	33.55	1
1	67.29	1	02.95	1	34.20	2
2	67.50	1	03.48	2	34.64	1

92	3	3466.34	1	3504.60	4	3540.72	1
40	1	66.96	2	05.45	2	42.30	5
57	3	67.09	2	05.66	1 +	42.90	1
00	1	67.99	2	07.16	1	43.25	1
34	4	68.65	1	07.44	1	43.80	1 +
7	2	68.97	1	08.25	3	44.74	1
2	1	69.07	1	08.60	1	45.02	1 +
2	1	69.36	2	10.12	1	47.25	1
6	1	69.76	1	10.92	2	47.54	1
6	1	70.35	1	11.93	1	48.01	1
8	1	70.70	1	13.86	2	48.58	1 +
1	2	71.07	2	14.36	1	48.85	1 +
1	1 +	71.74	1	14.90	2	49.25	1
0	2	73.35	2	15.27	1	51.10	1
2	3	74.10	1	15.91	1	51.74	1
3	2	74.35	1	17.69	3	52.51	1
6	2	74.44	1	18.35	3	52.86	2
0	1	74.78	1	18.69	1	53.99	1
0	1	75.19	2	20.49	1	54.34	2
9	10	75.65	1 +	20.73	1	55.56	2
5	1	76.96	1	21.17	1	55.77	1
4	1	77.68	1	21.28	1	56.84	1
5	1	79.59	3	21.57	3	57.09	1
0	4	80.25	2	22.48	2	57.60	1
3	1	81.94	2	23.45	1	58.23	2
8	2	82.58	3	24.32	3	58.34	1
8	1	83.81	2	24.74	3	58.96	1
0	2	84.02	2	25.62	3	59.40	1
4	2	85.64	1	26.06	1	59.70	1
2	1	86.10	2	26.44	1	60.26	2
3	1	87.47	1	26.66	1	61.04	1
6	2	87.65	1	27.49	1	61.33	1
4	1	89.56	1	28.87	1	61.42	1
7	2	90.44	1	29.50	1	61.81	1
3	4 d?	91.30	1	30.94	1	62.25	2
0	1	91.50	1	31.41	2	62.96	1
7	2	91.99	2 d	31.7	1 +	63.32	3
5	2	93.00	1	34.10	1	63.90	2
9	2	93.09	1 Ni?	34.83	2	64.45	2
2	3	93.48	2	35.40	1	66.20	2
3	1	95.14	1	35.93	1	66.55	1 +
3	1	96.83	2	36.27	1	66.90	1
5	1	98.20	1	37.42	3	67.21	1
3	1	99.05	1	39.05	1	67.64	1
6	1	99.36	1	39.24	1	67.90	1
4	1	3501.46	1 +	39.62	1	68.22	1
7	1	02.10	1 +	40.14	1	68.30	1
0	2	02.50	1	40.34	1	68.66	1
9	2	03.65	1	40.59	1	69.04	1

1	3603.11	3	3641.54	1	3676.13	1
1	03.77	1 +	41.95	1	70.38	2
1	03.87	1 +	42.37	1	77.84	2
2	04.22	2	42.56	1	79.12	1
2	04.70	1	42.89	1	79.36	1
1	05.17	1	43.6	1 + br	80.34	1
1	05.55	1 +	44.45	1 +	80.84	4
3	06.40	1 + d	45.74	1 +	81.02	1
2	07.55	1	47.01	1	81.45	1
1	08.52	3	48.77	2	81.70	1
1	09.65	2	50.34	1 +	81.88	1
1	10.77	1	50.74	1	82.10	1
1	11.34	1	51.25	1	82.85	1
1	12.16	2	51.52	2	84.06	1
1	12.61	2	53.84	1	84.50	1
1	13.51	2	54.04	1	85.95	1
2	13.80	2	54.73	2	86.27	2
1	14.43	5	55.20	1	86.74	1
4	14.85	1 +	57.52	3	87.14	1
1	15.28	1	58.30	1	88.13	1
1	15.86	2	58.50	1	88.45	1
1	16.20	1	59.53	4	89.14	2
1	16.98	2	61.10	2	90.29	1
2	17.32	1	61.25	1	90.78	2
1	19.49	1 Ni?	61.95	2	92.25	2
1	21.78	1	62.33	1	92.80	2
1	22.20	1	63.16	2	93.53	2
2	22.51	1	63.45	2	94.78	1
1	23.40	3	63.85	1	95.13	4
2	24.62	3	64.14	1	95.69	1
1	24.77	3	64.48	2	96.20	2
2	25.16	1	64.99	3	97.59	1
1	25.80	1	65.90	2	98.31	1
1	26.36	3	66.87	2	98.68	1
1	28.50	2	67.12	2	99.26	1
1	28.81	2	67.47	1	3700.19	2
2	29.42	3	67.84	1	01.70	1
2	33.0	1 + br	68.17	1	02.21	2
1	35.25	2	68.46	1	02.35	1
1	35.58	3	68.66	1	02.69	2
1	35.73	2	69.51	2	05.60	1
1	36.95	1	70.55	1	05.75	2
3	37.63	2	71.81	1	07.33	2
1	38.32	2	72.05	1	08.20	1
1	38.60	1 +	72.99	3	08.72	2
2	39.12	1	73.36	1	10.31	2
1	39.66	1	74.03	1	11.65	2
1	40.78	2	75.05	1		

3713.10	2	3752.76	1	3786.11	1	3821.05	1
13.61	2	53.75	1	86.33	1	21.33	1
14.70	2	55.29	2	86.52	1	21.81	1
15.35	1 +	55.66	1 +	88.39	2	22.10	1
15.80	3	55.98	1	92.27	1 +	22.46	1
16.20	2	56.48	1	92.47	1	23.13	3
17.00	2	58.69	2	93.78	2	23.94	1
18.60	1	59.75	1	94.59	2	24.31	1
19.70	2	60.20	1	95.46	1	24.94	1
19.79	1	60.28	1	95.92	1	25.07	1
20.39	2	61.04	2	96.18	1	25.46	1
22.45	1	61.92	2	96.44	1	25.60	1
23.36	1	62.23	1	96.85	1	26.85	4
23.65	2	62.95	1	97.20	1	27.30	2
23.95	2	63.50	2	97.46	1	28.35	1
24.47	1	64.59	1	98.41	50 u	28.55	1
25.32	1 +	65.19	1	3800.21	1	29.02	4
25.70	2	65.40	2	01.09	1	29.94	1
26.39	2	65.72	1	02.00	3	30.05	1
26.71	1	65.90	1	02.31	1	30.19	1
28.41	2	66.55	1	03.16	1	30.52	1
28.61	2	67.90	1	03.95	1	30.95	1
30.68	1	68.80	1	04.66	2	31.20	1
31.78	1	68.90	1	05.22	1	31.60	1
32.87	3	69.28	1	06.11	2	31.90	1
33.15	2	70.16	1	06.84	1	32.24	2
33.85	1	70.64	5	07.12	1	33.3	1 +
34.47	2	71.60	1	07.53	1	33.88	5
35.74	1	72.12	3	07.75	1	34.75	1
36.03	1	72.99	2	08.01	1	35.10	1
36.29	1	73.52	1	08.76	1	35.43	2
38.02	2	75.80	1	09.26	1 +	36.66	1
39.00	1 +	76.25	1	10.27	1	37.03	1
39.26	1 +	76.71	1	10.70	1	37.99	1
40.67	1	77.19	1	10.95	1	38.43	1
40.93	1	77.50	1	11.55	2	39.33	1 +
41.25	1 +	77.86	1	12.60	2	39.60	1
42.41	2	78.10	1	14.05	1	41.85	1
43.94	1	79.64	1	14.25	1	42.10	1 +
44.24	1	79.91	2	14.65	1	43.11	1
44.51	2	80.79	1	15.00	1	44.03	1
45.07	1	81.37	1	15.21	1	44.35	1
45.55	1	81.78	3	17.30	1	45.17	1
46.04	2	82.35	1	17.49	1	45.57	1
47.34	2	82.84	1	18.14	1	46.09	2
48.65	2	83.69	1	18.39	1	46.28	2
51.35	2	84.60	1 +	18.81	2	47.40	3
52.10	1	85.18	2	19.17	1	48.42	3
52.52	1	85.66	2	19.99	2	49.16	1

94	1	+	3900.80	1	3938.84	1	3980.86	1			
64	1		01.93	3	39.35	1	81.84	1			
14	2		02.45	1	+	39.60	1	81.95	1		
55	1		03.11	30	u	40.46	1	82.24	2		
67	1	+	04.64	1		41.63	1	82.78	2		
33	1	+	04.95	1		41.90	1	84.95	1		
75	1	+	07.10	2		42.30	1	+	85.89	1	
78	1		08.40	1		43.20	4		86.43	3	
12	1		08.53	1		43.65	1		87.15	1	
33	1	+	09.70	1		44.86	1		87.55	1	
33	1		11.25	1		45.39	2		90.10	1	
46	1		11.35	1	+	46.98	1	+	d	91.56	1
65	1		12.11	1		47.30	2		92.05	1	
30	50	u	12.29	1		47.64	1		92.99	1	
29	1		12.70	1		48.76	1		93.23	1	
86	1		13.53	1		50.40	1		94.12	1	
94	1		13.66	1		51.15	2		94.51	1	
81	1		13.81	1		51.49	1		94.80	1	
60	1		15.19	1		51.67	1		95.65	1	
96	1		15.56	2		52.43	1		96.47	1	
23	3		15.75	1		52.70	1	+	98.45	1	
60	1		16.56	1		53.15	1	+	4000.62	4	
77	1		17.05	2		54.05	2		01.87	1	
20	1		17.65	2		55.63	2		03.61	1	
93	1		17.89	2		57.78	1		04.52	1	
32	2		19.45	1		58.13	1		05.04	1	
15	1		21.06	1		58.75	2		05.90	1	
65	1		21.47	1		58.98	1		06.21	2	
10	1		21.93	1		59.49	1		06.85	1	
67	1		22.46	2		59.83	1		07.60	1	
98	3		22.81	1		60.10	1		08.20	2	
84	1		23.90	2		62.25	1		08.94	1	
11	1		24.76	1		63.68	1		09.53	2	
35	2		26.33	1		64.15	1		10.30	1	
00	2		26.50	1		65.04	1		11.86	1	
43	1		26.57	1		65.46	1		12.14	2	
12	1		28.44	1		65.90	2		12.42	1	
60	1		28.85	1		66.29	1		12.66	1	
86	1		28.93	1		68.91	2		12.95	1	
26	1		30.16	1		70.95	1		16.82	1	
00	1	+	31.54	1		71.13	1		17.50	2	
45	1		32.75	1		73.14	1		18.30	1	
50	1		34.36	1		73.94	2		19.28	1	
52	1		35.10	1		74.09	2		20.60	1	
75	1		35.29	1		76.10	2		20.80	1	
99	1		35.80	1		76.75	1	+	br	21.15	2
65	1		36.25	1		78.05	1		24.23	3	
10	1		36.83	1		79.37	1		25.37	1	
38	1		38.53	1		80.36	2		25.64	1	

5	2 + r	4075.40	3	4120.85	1	4170.90
5	1	75.71	2	22.55	1	71.29
6	2	76.10	2	23.81	3	71.65
9	1 +	76.34	3	24.70	3	74.27
8	1 +	76.70	1	26.69	2	75.30
5	1 +	77.85	2	27.80	1	77.09
5	2	78.21	1	28.41	3	77.43
7	2	78.51	1	28.98	2	78.44
1	2	79.27	1 +	29.84	1	78.70
1	1	79.50	1	30.25	1	80.15
1	1	81.62	5	32.13	3	80.70
6	2	81.95	2	32.37	3	81.25
2	2	82.70	1	33.10	1	83.26
3	3	83.87	1	35.55	1 +	84.4
4	1	84.59	6	37.10	1	84.57
9	1	85.67	1	38.35	1	85.99
6	1	86.18	3	38.70	1	86.44
1	2	87.63	1	39.68	1	87.74
0	1	87.91	1	42.25	1	88.49
5	1	88.78	2 + br	42.33	1	90.18
8	1 +	89.89	1	43.73	8	90.65
2	1 Wo?	90.57	1	45.75	1	92.37
5	1 d	91.06	1	46.64	1	94.1
5	1	93.33	1	47.90	1	94.73
0	1	94.61	1 d	48.45	1	97.20
5	1	95.46	1	48.85	1	97.53
5	2	96.61	1	49.12	3	98.75
2	1	96.99	4	49.55	1	99.77
5	1	97.85	1	49.86	1	99.97
0	1	98.34	2	51.57	1	4200.32
5	1	98.90	4	52.07	2	00.72
7	1 +	4102.34	5	53.36	1	01.47
5	1	03.92	1	55.49	4	03.27
3	1	05.24	4	55.76	4	04.86
3	3	05.69	2	56.95	2	05.98
0	2	07.68	8	57.58	4	07.38
2	1 +	08.25	2	58.20	2 +	07.55
7	2	10.45	1	60.43	1 +	07.68
0	1	10.87	1	61.05	1	08.96
7	3	11.10	1 +	62.85	3	09.84
2 + br		11.96	1 + Va?	64.26	2	10.50
6		12.29	1 +	65.1	2 + br	11.19
6	1	13.76	1	65.58	1	14.22
6	1 d	15.09	2	65.95	1	15.18
3	2	16.1	1 +	66.47	2	16.99
3	1	16.45	1	67.54	1	19.15
3	1	19.11	3	68.68	2	19.51
1	1	19.77	1	70.01	2	22.06

3849·94	1 +	3900·80	1	3938·84	1	3980·86	1
51·54	1	01·93	3	39·35	1	81·84	1
52·14	2	02·45	1 +	39·60	1	81·95	1
52·55	1	03·11	30 u	40·46	1	82·24	2
52·67	1 +	04·64	1	41·63	1	82·78	2
53·63	1 +	04·95	1	41·90	1	84·95	1
54·75	1 +	07·10	2	42·30	1 +	85·89	1
55·78	1	08·40	1	43·20	4	86·43	3
56·12	1	08·53	1	43·65	1	87·15	1
57·33	1 +	09·70	1	44·86	1	87·55	1
57·83	1	11·25	1	45·39	2	90·10	1
58·46	1	11·35	1 +	46·98	1 + d	91·56	1
62·65	1	12·11	1	47·30	2	92·05	1
64·30	50 u	12·29	1	47·64	1	92·99	1
65·29	1	12·70	1	48·76	1	93·23	1
66·86	1	13·53	1	50·40	1	94·12	1
66·94	1	13·66	1	51·15	2	94·51	1 +
67·81	1	13·81	1	51·49	1	94·80	1 +
68·60	1	15·19	1	51·67	1	95·65	1 +
68·96	1	15·56	2	52·43	1	96·47	1 + d
69·23	3	15·75	1	52·70	1 +	98·45	1
70·60	1	16·56	1	53·15	1 +	4000·62	4
70·77	1	17·05	2	54·05	2	01·87	1
73·20	1	17·65	2	55·63	2	03·61	1
73·93	1	17·89	2	57·78	1	04·52	1 +
74·32	2	19·45	1	58·13	1	05·04	1 +
79·15	1	21·06	1	58·75	2	05·90	1
79·65	1	21·47	1	58·98	1	06·21	2
83·10	1	21·93	1	59·49	1	06·85	1
85·67	1	22·46	2	59·83	1	07·60	1
86·98	3	22·81	1	60·10	1	08·20	2
87·84	1	23·90	2	62·25	1	08·94	1 Wo?
88·11	1	24·76	1	63·68	1	09·53	2
88·35	2	26·33	1	64·15	1	10·30	1
89·00	2	26·50	1	65·04	1	11·86	1
89·43	1	26·57	1	65·46	1	12·14	2
90·12	1	28·44	1	65·90	2	12·42	1
90·60	1	28·85	1	66·29	1	12·66	1
90·86	1	28·93	1	68·91	2	12·95	1
91·26	1	30·16	1	70·95	1	16·82	1
92·00	1 +	31·54	1	71·13	1	17·50	2
92·45	1	32·75	1	73·14	1	18·30	1 + d
93·50	1	34·36	1	73·94	2	19·28	1
96·52	1	35·10	1	74·09	2	20·60	1
96·75	1	35·29	1	76·10	2	20·80	1
96·99	1	35·80	1	76·75	1 + br	21·15	2
97·65	1	36·25	1	78·05	1	24·23	3
98·10	1	36·83	1	79·37	1	25·37	1
3900·38	1	38·53	1	80·36	2	25·64	1

4026.15	2 + r	4075.40	3	4120.85	1	4170.90	1 +
27.05	1	75.71	2	22.55	1	71.29	2
28.76	2	76.10	2	23.81	3	71.65	1
28.99	1 +	76.34	3	24.70	3	74.27	1 +
29.68	1 +	76.70	1	26.69	2	75.30	1
30.05	1 +	77.85	2	27.80	1	77.09	1
32.65	2	78.21	1	28.41	3	77.43	3
33.77	2	78.51	1	28.98	2	78.44	3
34.11	2	79.27	1 +	29.84	1	78.70	1 +
35.81	1	79.50	1	30.25	1	80.15	1
36.81	1	81.62	5	32.13	3	80.70	1
37.46	2	81.95	2	32.37	3	81.25	3 +
37.92	2	82.70	1	33.10	1	83.26	1
38.23	3	83.87	1	35.55	1 +	84.4	1 +
39.14	1	84.59	6	37.10	1	84.57	2 +
40.79	1	85.67	1	38.35	1	85.99	5
41.26	1	86.18	3	38.70	1	86.44	2
43.01	2	87.63	1	39.68	1	87.74	1
43.40	1	87.91	1	42.25	1	88.49	10
43.85	1	88.78	2 + br	42.33	1	90.18	3
45.28	1 +	89.89	1	43.73	8	90.65	1
45.72	1 Wo?	90.57	1	45.75	1	92.37	1
47.05	1 d	91.06	1	46.64	1	94.1	1 + br
47.35	1	93.33	1	47.90	1	94.73	4
47.70	1	94.61	1 d	48.45	1	97.20	1
49.75	1	95.46	1	48.85	1	97.53	1
50.25	2	96.61	1	49.12	3	98.75	1 +
50.62	1	96.99	4	49.55	1	99.77	1 +
51.35	1	97.85	1	49.86	1	99.97	1 +
52.10	1	98.34	2	51.57	1	4200.32	1 +
52.45	1	98.90	4	52.07	2	00.72	2
52.67	1 +	4102.34	5	53.36	1	01.47	3 +
54.95	1	03.92	1	55.49	4	03.27	1
55.73	1	05.24	4	55.76	4	04.86	2
56.18	3	05.69	2	56.95	2	05.98	3
56.50	2	07.68	8	57.58	4	07.38	1 +
57.62	1 +	08.25	2	58.20	2 +	07.55	1 +
57.77	2	10.45	1	60.43	1 +	07.68	1 +
59.40	1	10.87	1	61.05	1	08.96	1
59.77	3	11.10	1 +	62.85	3	09.84	1
60.4	2 + br	11.96	1 + Va?	64.26	2	10.50	1
62.25	6	12.29	1 +	65.1	2 + br	11.19	3
64.35	1	13.76	1	65.58	1	14.22	1
64.75	1 d	15.09	2	65.95	1	15.18	1 +
66.53	2	16.1	1 +	66.47	2	16.99	1
67.13	1	16.45	1	67.54	1	19.15	1
67.86	1	19.11	3	68.68	2	19.51	2
69.00	1	19.77	1	70.01	2	22.06	2
70.12	10	20.29	8	70.54	1	23.10	2

4224.07	1	4282.00	2	4329.80	2	4373.73	1 +
24.90	1 +	82.62	1	30.25	2	75.19	10
25.10	1 +	83.46	1	31.56	1	76.85	2
26.46	1	84.79	5	32.70	1	77.91	1
28.95	1	85.76	1	32.95	1	80.49	4
29.69	1	87.23	4	33.41	1	80.79	2
31.83	1	88.43	1	34.12	1	81.35	2
32.82	10	88.82	10 r	34.66	1	81.85	15
33.65	2 +	89.58	3	35.00	3	82.56	2
34.13	1	90.40	4 +	36.37	1	84.36	2
35.22	2	91.40	3	38.85	2	86.04	2
37.33	3	91.86	1	39.39	2	87.49	1
39.29	4	92.37	10	40.00	2	88.50	1
40.22	3	93.42	10	40.90	3	89.74	1
40.46	3	94.03	10	41.58	3	91.70	3
41.01	4	96.34	2	42.14	1	92.30	3
42.95	2	96.80	2	44.26	1	93.91	2 +
44.96	1	97.80	1	44.80	2	94.53	2
46.19	4	99.06	2	45.82	1	94.66	2
49.68	1	4300.04	1	46.32	2	96.55	1
51.57	1	01.44	2	47.03	1	96.88	4 r
52.02	4	02.10	1 +	47.64	1 +	97.46	4 r
52.66	1	04.20	2	49.34	1	98.66	1
53.75	2	04.82	1	50.52	8	99.39	1
55.10	3	05.09	2	51.26	1 +	4400.83	1 +
56.97	1	06.82	1	51.70	1	01.43	1 +
57.18	1	08.83	1	53.04	1 +	02.67	2
58.84	2	10.58	3	53.46	3	03.08	3
60.52	2	12.97	2	54.85	1	04.67	2
60.85	2	13.16	2	57.51	2	05.18	1
61.15	1	13.74	1	58.00	1	07.03	1
61.62	2	15.27	1	58.70	2	08.98	1
63.26	1	15.56	1	59.79	2	09.59	2
64.79	2	15.98	1	61.28	1	10.10	3
65.27	2	16.54	1	61.60	1	11.86	20
66.35	3	17.40	1 +	62.21	2	12.91	4
68.24	3	18.09	3	62.89	2	13.82	1
69.47	4	18.40	1 +	63.19	1	14.52	1
72.24	1	18.77	1 +	63.83	1	15.54	1
73.25	4	19.68	1 +	64.67	3	15.84	1
74.21	1	21.95	1	64.86	2	17.07	1 +
75.84	2	22.16	3	66.09	1	17.37	1
77.10	4	22.65	1	66.71	3	19.89	1
77.49	10 d	24.70	1	68.05	1	20.90	1
78.74	1	25.45	1	68.96	1	21.6	1 + br
79.16	1	26.29	8	69.25	10	22.24	2
80.19	1	26.90	5	70.33	1	23.03	1
81.06	1	28.86	1	72.30	2	23.25	1
81.35	1	29.52	1	73.53	2	23.81	10

4424.36	1	4477.33	1	4541.74	2	4601.09	1
26.86	5	79.17	1	43.05	1	01.60	1
28.35	1	81.46	1	45.23	1	03.75	1
29.27	1	85.15	5	46.75	1+	04.32	1
31.04	1	85.93	1+	47.35	1+	06.35	1
33.05	1	87.21	4	47.70	1+	06.71	1
33.68	1	89.17	2	48.00	1+	07.28	2
35.19	10	90.39	3	49.33	1+	08.28	1
36.85	1+	91.48	5	49.60	1	08.85	2
37.05	3	91.85	1	53.00	1	10.04	10
37.21	2	92.25	1+	53.43	4	11.00	1
37.60	1	94.26	1	53.97	2	11.36	2
39.12	2	96.33	1	56.22	1	12.15	1
39.68	1+	99.60	3	58.29	4	12.40	1
40.35	1	4501.48	4	58.93	2	13.46	1
40.88	1	03.65	1+	59.93	1	14.91	1
42.37	8	04.63	1+	60.30	3	15.63	1
43.26	5	05.08	1+	65.88	1	16.78	2
44.20	2+	06.19	5	67.05	1	17.80	1
44.61	1	06.85	3	67.54	1	18.12	2
44.90	1	08.35	1	67.87	3	19.88	1+
46.59	3	12.35	5	69.19	2	21.53	5
46.94	1	14.56	1	70.30	3	22.75	1
47.40	1	15.31	3	70.79	1 Wo?	23.63	2
49.93	10	17.29	4	71.25	2+	24.40	3+
52.74	2	17.59	3	72.00	2+	26.62	10
54.04	1	18.60	1	74.72	2+	27.67	5
54.93	1	21.32	1	75.35	1+	28.59	1
55.46	1	21.75	1	76.05	2	28.90	1
57.55	10	22.38	3	76.67	8	30.20	2
58.24	1	23.75	1	77.94	2	31.10	1
58.83	2	24.50	5	78.65	1	31.72	1
60.80	3	24.85	1+	79.87	1	32.73	1
61.70	1+	25.49	1	82.53	2	33.27	3
62.00	1+	26.03	1	82.65	2	33.83	1
63.67	1	26.52	4	84.63	1+	35.20	1
64.66	1	28.05	1	86.22	2	37.93	1
64.94	3	28.74	3+	86.74	1	38.55	1
67.61	1	29.53	4	86.94	1	39.57	1
68.42	10	33.45	1	87.59	1	41.10	1
69.55	1	34.60	2	88.30	1	41.75	1
71.21	1	35.09	2	89.5	1+	42.88	2
71.82	3	35.53	2	90.53	3+	44.40	1+
72.20	3	35.67	2+	92.39	2	45.57	1
72.77	1	36.98	5	93.82	1	46.52	1+
73.39	5	38.55	1	95.32	5	46.65	1+
74.80	10	39.16	1	98.04	2	48.00	3
75.43	1	39.76	1	98.40	2	49.26	2
75.80	3	40.97	1+	99.31	3	51.25	2

4652·53	2 + br	4716·84	1	4795·57	1 +	4885·50	1
53·82	1	18·10	4	96·70	3	85·84	1
56·22	1	19·09	2	4801·20	1 +	86·67	2
56·51	1	23·23	1 +	05·10	1	87·40	1
57·67	1	23·60	1 +	05·73	2	89·40	2
58·75	1	25·54	1	08·25	2	94·60	1
60·07	2	29·31	3	08·66	1	95·14	1
62·11	3	30·57	1	11·26	3	96·63	1
62·93	4	31·62	10	12·65	1 +	97·47	2
63·30	1 +	34·30	1	13·34	1 +	99·77	1
65·59	1	35·49	1	14·25	1 +	4900·65	1
68·99	1	36·79	1	14·64	1	04·01	3
69·80	1	40·55	1 +	17·10	1 +	04·60	1
70·22	1	43·25	1	17·87	2	07·61	2
70·63	1	43·80	1 +	19·40	5	09·39	2
71·43	1	48·67	1	22·60	1	12·4	1 + br
72·09	3	49·03	1	23·12	1 +	16·40	1
73·28	1	50·60	3	27·63	1 +	17·52	1
74·01	1	51·31	1	28·60	2	18·35	1 + br
75·90	1	53·55	1	30·10	1	22·78	1
77·86	1 +	55·18	1	30·68	4	23·15	1
78·40	1	55·50	1	33·01	2	23·55	1
80·73	2	56·06	1	34·10	2	23·67	1
81·26	1	57·35	1	35·90	1	25·01	1
81·83	1	57·74	1	38·26	1	26·40	2
82·18	1	58·67	4	39·70	1	26·63	2
82·45	1	59·85	1	45·31	1	27·23	1
84·02	2	60·35	10	46·80	1 +	28·50	1
84·56	1	61·30	1 +	47·40	1 +	31·37	1
86·04	1	63·00	1	48·30	1 +	32·20	1 +
86·33	1	64·60	3 v	50·00	1 +	32·50	1 +
88·41	3	71·05	1	51·63	1 +	33·30	3
89·67	1	73·57	4	51·87	1 +	33·55	2
90·36	1	74·40	2	54·67	1	33·95	1
91·09	2	75·82	3	55·91	1	37·60	1
92·20	1	76·49	3	58·42	3	39·89	1
92·90	1	78·03	1	60·25	2	41·87	3
93·56	1	83·09	3	60·80	1 +	42·56	1
94·11	2	84·60	1	60·99	1 +	44·05	1
96·06	1	85·30	3	66·02	1	45·46	1
96·70	1	86·61	2	68·21	5	47·50	1
99·00	1 +	87·80	1	68·96	1 +	49·20	1
4700·68	2	88·34	1	69·40	3	50·81	3
01·79	1	89·50	1	75·30	1	52·13	1
06·27	8	92·00	1	78·56	2	53·95	1
07·43	10	92·93	3	81·01	1	56·02	1 +
08·40	6	93·60	3	82·09	1	56·73	1
10·20	1	94·01	2	84·53	1	59·82	1
14·68	2	94·80	1	85·15	1	60·50	1 +

4961.00	1	5029.50	1	5097.71	4	5193.92	1+
61.68	1	30.98	3	98.23	2	96.25	1+
63.11	1	32.55	1	99.23	1	97.10	1+
64.40	2	33.60	1	5100.54	1	98.80	1+
64.60	2	34.35	1	02.40	1+	5200.32	4
66.67	1	37.36	1	04.90	1+	00.91	3
68.80	1	37.70	1	09.45	1	04.11	1
69.83	1	39.09	2	09.89	3	10.60	2
70.0	1+	42.80	1+	10.58	2	12.03	3
70.56	1	44.6	1+	15.13	3	19.59	3
70.95	1	45.55	1+	15.81	1	30.40	1+
73.56	2	46.19	2	17.12	2	31.28	3
76.15	2	47.88	3	18.44	1	32.58	2
77.87	2	48.63	1	19.39	1	34.48	3
78.55	1	53.77	1+	21.95	1	35.55	1+
79.28	5	54.25	1	24.00	2	38.39	10+
80.18	1	54.48	1+	24.75	1	41.20	8+
81.25	1	55.20	2	26.90	1	43.02	5+
82.02	2	57.10	1	27.27	1	45.70	3
83.66	1	57.50	1	28.20	1+	50.50	1+
85.75	2	58.27	2	28.63	1+	51.82	1+
88.15	2	60.05	5	31.62	1+	54.90	1+
89.42	1+	60.59	1	34.65	1+	56.60	1+
91.30	1+	62.72	2	35.12	1	59.21	5
92.46	1	64.81	2	41.43	1	60.40	1+
95.52	2	66.65	1+	42.41	1	61.31	3
97.66	1	68.28	1	45.53	4	69.10	1+
99.73	1	69.36	1	46.25	1+	69.76	2(Fe)
5000.10	3	72.00	1+	46.87	1+	71.92	2
07.80	1	72.87	1	47.53	4	76.40	1
09.23	1	74.86	2	48.60	1+	77.50	1
10.30	1	76.20	1+	49.84	1+	79.80	5
11.02	1	76.54	1+	53.50	1+	81.00	4
11.85	1	77.22	1	55.42	1+	83.9	2+
12.55	1	77.69	1	56.39	1	84.30	1
14.79	3	80.20	4	60.67	1+	92.25	3
16.30	1+	81.48	2	63.38	3	93.61	2
16.97	2	84.43	1	67.92	3	95.60	3
17.7	1+	84.89	1+	70.9	1+br	97.10	1
18.96	1	86.57	1+	71.37	8+	98.20	1
20.03	1	87.98	1+	73.11	10+	5302.50	1
21.43	1	90.81	1	74.30	10+	04.03	1+
22.2	1+	91.20	2	77.26	1	12.93	1+
22.6	1+	91.58	2	78.99	1+	13.45	1+
23.79	1	92.41	2	79.58	1+	14.07	3
24.39	1+	93.00	2	80.20	1+	15.21	2
25.59	1	96.10	2	80.41	1+	16.00	1+
26.60	1	96.43	1	81.4	1+br	17.30	1+
29.18	3	96.86	3	91.61	2	18.10	1+

5320.08	1 +	5453.22	2	5552.42	1	5642.60	1 +
24.68	1	56.68	3	56.50	3	50.33	10
26.10	1	58.60	1	56.93	2	51.52	1
27.29	2	60.79	3	58.25	1 +	52.05	1
28.20	2(Fe)	64.12	1	59.96	1 +	52.42	1
34.95	1 +	64.69	1 +	61.02	1 +	55.67	1
37.40	1 +	65.78	2	62.70	1 +	64.59	2
39.25	1 +	69.40	1	63.60	1 +	67.50	2
49.00	1 +	73.54	8	64.27	2	72.27	1
49.95	1 +	76.03	3	66.87	1	72.65	1
52.52	1	77.90	1	68.82	3	73.83	2
55.02	3	78.39	1	69.67	2	74.69	3
55.7	2 + br	79.28	1	70.69	20 +	78.09	3
56.63	3	80.73	1	75.39	3	83.11	3
60.80	20 +	88.82	1	77.82	1	87.82	1
64.40	10 +	89.58	1	80.39	1	89.34	10
67.18	3 +	90.48	3	83.50	1	89.71	2
71.65	2	92.38	3	83.90	1	90.50	1 +
72.55	2	94.08	3 +	87.93	1	94.59	1
72.93	1	97.20	2 +	89.70	1 +	95.05	1 +
76.13	1 +	98.70	3	91.80	2	95.60	1 +
88.90	2 +	99.70	2 +	95.07	1 +	97.22	1
94.70	3	5501.72	3	96.55	1 +	98.50	1
97.64	2	02.12	2	5601.29	2	99.49	2
98.94	1	03.80	2 +	02.98	3	5702.30	2
5400.66	3	06.62	50 +	05.63	1	05.91	5
02.90	1 +	10.52	1	07.84	1	07.21	1
06.00	2	11.24	1	08.83	3	08.20	1
06.60	1	11.69	2	09.50	3	10.30	1 +
14.85	1	12.64	1	09.75	1 +	11.99	2
17.52	2	14.00	1	11.13	4	15.31	1
26.20	1	17.59	1	11.51	1	16.20	1
27.09	2	19.45	1	12.55	1	19.45	1
27.80	1	20.20	2	13.27	3	20.31	1
28.97	1	20.83	2	18.24	1	22.98	10
29.90	2 (Fe)	21.38	1	18.62	2	23.30	2
31.20	2	26.69	3	19.01	1	27.22	2
34.75	2 (Fe)	27.13	2	19.54	2	27.83	1 +
35.86	3	29.48	1	21.03	1	28.92	2
37.93	4	31.38	1 +	21.72	1 +	29.70	2
39.90	2	31.83	1 +	22.40	1 +	30.09	2
41.18	1	33.21	30 +	26.97	1 +	31.43	1 +
42.24	1	34.71	1	27.44	1	34.20	2
43.99	1	37.90	1 +	30.82	1	36.60	1 +
47.10	2 (Fe)	39.59	3	32.70	10	37.23	1 +
47.82	1	41.82	2	35.02	3	38.20	1 +
48.76	1	43.30	3	39.60	1 +	39.80	1
49.10	1 +	44.69	3	41.07	1 +	41.85	1
50.72	4	52.00	1	42.00	1 +	42.70	1 +

5743.57	1 +	5849.94	10 +	5943.79	1	6075.78	1
46.97	1 +	51.73	10 +	47.74	1 +	79.79	3
47.80	2	53.42	1	49.35	1	81.50	2
51.63	20	54.48	1	52.2	1 +	83.00	1 +
55.75	1 +	58.45	15	57.84	1	84.80	1
57.66	1	60.70	1	62.85	1 + br	86.80	1
65.44	1	61.53	2	65.10	1 +	87.05	1 +
66.68	1	65.0	1 + br	65.72	2	96.36	1
67.47	1 +	67.60	1	66.04	1 +	6102.03	3
69.90	2	68.30	1	68.65	2	04.36	1
71.20	2	68.91	2	69.20	1	06.32	1 +
74.70	2	69.49	5	69.69	1	07.31	1
76.10	1	69.93	1	70.66	1	10.42	1
78.31	2	71.64	1	71.49	1	10.88	1 +
79.51	3	74.39	2	74.42	2	11.86	1
80.28	2	76.72	3	83.10	2	13.84	1
80.86	1	78.30	1	85.26	1	19.20	2
83.50	2 +	81.19	2	88.30	3	20.76	2
84.17	1	82.91	2	89.61	2	23.71	2
85.83	1	84.49	2	90.20	2	23.92	2
89.23	1	84.85	1	90.85	1 +	25.57	1
92.00	10	88.50	20	91.51	2	28.33	2
94.20	1 + br	90.91	1	96.7	1 + br	30.80	2
95.92	2	91.74	4	99.75	1	31.05	1 +
5800.60	2	92.44	3	6000.95	1	34.75	1
01.60	1	93.56	15	04.08	1 +	35.33	1 +
02.83	3	93.85	2 +	07.9	1 + br	35.52	1 +
04.15	1	96.10	20(Na)	09.64	1 +	38.76	1
06.38	1	97.99	1	10.22	1 +	39.50	1
06.89	2	98.93	2	10.45	1 +	45.15	1
08.25	1 +	99.80	1	11.50	2	48.52	1 +
08.41	2	5901.61	3	12.35	1 +	49.10	1 +
09.13	1 +	02.15	1	13.19	1	50.32	1 +
09.45	1 +	12.29	1	25.61	3	50.60	1 +
12.69	1	13.13	1	25.90	1 +	53.25	1 +
14.04	1	14.45	1	27.39	3	53.57	1 +
15.69	2	16.39	1 +	30.87	30	54.00	1 +
15.92	2	17.75	1	36.15	1	58.47	1 +
20.89	1	18.80	1 +	36.70	1	58.60	1
25.20	1	19.80	1 +	36.96	1	62.39	2
25.40	2	22.70	1 +	39.90	2	69.25	1 +
25.80	1 +	22.94	1 +	47.99	3	70.85	2
27.09	1	23.91	2 +	51.07	2	75.68	1
35.74	1	26.51	10	54.99	3	81.34	1
40.12	2	29.00	20	58.22	2	89.17	2
41.00	1	31.13	1	64.05	1	91.03	1
41.84	1	32.99	1 +	66.97	1 +	93.40	1 +
43.25	1 +	33.65	1	67.82	1 +	98.82	2
49.02	8 +	38.08	2	74.49	1	99.40	1

6208.47	2	6333.00	1+	6462.14	2+	6690.73	2
09.67	1	34.10	1+	63.72	2	91.34	1
12.65	1	35.22	1	67.20	1	97.0	1 + br
13.43	1	35.93	1	70.20	1	6703.36	1
14.85	1	38.80	1+	71.40	3	28.40	1
18.08	3	39.30	1+	74.21	3	34.23	8
22.05	1	40.10	2	76.53	1	46.34	3
24.72	1+	43.65	1+	79.39	1+	46.56	5
28.7	1 + br	57.32	5	86.13	2 + br	54.25	3
30.97	2	58.75	2	92.70	2	63.80	1
32.28	1+	60.00	1	93.35	3	65.20	1 +
43.05	1+	65.37	1	95.21	1	65.98	1 +
43.30	2	69.70	1 + br	6512.90	1	73.65	1 +
44.9	1 + br	70.60	1	20.07	3	75.00	1
48.0	1 + br	71.93	1	23.74	1	78.90	1
48.8	1 + br	72.51	2	27.82	1	88.31	1 +
52.80	1+	82.15	1+	36.48	2	89.20	1 +
53.75	1	83.95	1	37.80	2	6800.25	1 +
55.88	1	88.90	1+	43.25	1	02.95	1
56.50	2+	89.30	3	52.85	1	12.80	1 +
57.05	1+	90.9	1 + br	53.56	1+	25.94	1
58.05	1+	91.30	2	70.02	1	29.30	1 + d
59.68	1+	93.80	1	71.39	1	39.19	3
64.48	3	6400.20	1+	72.55	1+	49.17	1
66.02	3	01.28	4	80.36	1	86.65	2
72.45	1+	01.48	1	90.64	1	92.73	1
74.81	1	04.60	1+	91.11	2	98.37	1 +
76.83	1	06.61	2	6603.80	1+	99.30	1 +
78.63	1	07.13	1	11.49	3	6908.55	1
82.11	2	07.87	1	19.40	10	14.33	3
83.16	1	09.27	4	24.78	2	34.45	1
84.25	1 + br	12.58	3	37.34	1	47.72	1
86.75	2	13.10	2+	49.69	1	60.00	1 +
90.90	3	14.35	1	50.02	1	61.80	1 + br
93.80	1+	19.19	1	50.65	8	79.07	1
6301.97	2	19.92	2	58.25	1+	89.27	1
06.61	1	21.57	1+	59.95	2	92.03	1 +
11.85	1 + br	24.58	10	72.50	1+	7001.97	1
17.03	1	29.20	3 d?	78.25	1+	38.35	1 +
18.6	1 + br	31.05	1+	79.20	1+	60.52	1 +
19.2	1 + br	39.9	1 + br	79.97	1+	7110.28	2 +
23.70	2	46.50	3	88.15	1	7242.9	1 + br
29.68	1	53.46	1				

XL. N. Stickstoff.

Ältere Messungen: Fehlen.

Material: Atmosphärische Luft.

Linienzahl: 0.

XLI. Na. Natrium.

Ältere Messungen: H. Kayser und C. Runge, Berl. Akad. (1890).

H. Lehmann, Ann. d. Ph. 5 (1901) (Ultrarot). R. Schillinger, Wiener Akad. 118 II a. (1909). J. M. Eder und E. Valenta, Wiener Akad. 119 II a. (1910) (Rot).

Material: Natriumchlorid auf Gaskohle.

Verunreinigungen: Ba, Ca, K, Li.

Linienzahl: 25.

2680·50	2 + br, u	4499	1 + br	4979·1	2 + br	5683·1	10 + br, r
2853·00	20 u	4666	1 + br	83·5	2 + br	88·6	15 + br, r
3302·56	100 u	70	1 + br	5149·2	1 + br	5890·20	1000 u
03·11	100 u	4748·6	2 + br	53·75	2 + br	96·17	1000 u
45·13	1 +	52·6	2 + br	5670·5	1 + br	6154·48	20
3427·2	1 + br	4975·0	1 + br	75·8	1 + br	61·01	30
3974·1	1 + br Ca?						

XLII. Nb. Niob.

Ältere Messungen: J. M. Eder und E. Valenta, Wiener Akad. 119 II a. (1910) (Rot).

Material: Niobammonfluorid aus Nioboxid von Prof. W. Muthmann, auf Gaskohle.

Verunreinigungen: Ti.

Linienzahl: 1770.

2376·49	1	2504·75	1	2567·62	1	2590·05	2
87·63	1	11·09	1	69·15	1	92·28	2
98·60	1	21·50	1	70·91	1 +	94·82	1
2412·56	1	25·91	1	71·18	1 +	97·25	1
17·06	1	41·53	1	71·45	1	2601·40	1
18·77	1	44·91	1	72·20	1	01·95	1
33·84	1 +	51·49	1	76·75	1	02·13	1
36·40	1	54·20	1	78·29	1	10·38	1
45·18	1 +	55·73	1	78·85	2	12·50	1
63·00	1	57·04	1	81·32	1	16·55	1
66·82	1	59·05	1	83·25	1	20·55	1
69·18	1	63·55	1	83·33	1	20·68	1 +
77·49	1	65·52	1	84·10·	2	23·61	1

2627.55	2	2715.76	1	2793.16	2	2879.47	1
28.60	1	15.96	1	95.98	1	79.57	1
32.63	1	16.16	1	99.02	1	80.84	2
34.80	1	16.37	1	99.48	1	83.32	5
38.05	1+	16.69	3	2800.43	1	85.06	1
41.01	1	17.37	1	02.19	1	87.18	1+
41.16	1+	20.10	1	03.93	1	87.40	1+
42.34	2	20.31	1	04.35	1+	88.93	3
46.35	2	21.73	1	08.15	1	90.00	1
47.58	2	22.07	3	09.25	1	90.30	1
49.60	2	22.40	1	10.92	1	90.47	1
51.20	1	24.05	2	11.76	1+	96.36	1-+
53.03	1+	26.15	1	16.75	1	96.55	1+
53.47	2+	28.13	1	19.34	1	97.13	1
54.51	2	29.90	1	20.94	1	97.46	1
55.76	1	30.40	1	22.05	1+	97.93	4
56.14	2	33.32	3	25.30	1	99.35	3
57.04	1	33.51	2	26.57	1	2903.78	2
57.67	2	37.15	2	27.19	3	06.53	1+
61.91	1	40.25	2	29.85	1	08.37	4
65.32	1	41.23	1	35.25	2	09.02	1
66.67	2	45.40	1+	36.36	2	10.73	5
67.28	1+	45.81	1	41.05	1	11.88	3
67.37	2	46.98	2	41.29	3	16.60	1+
67.85	1	48.92	2	42.13	1	17.16	1
68.36	2	53.12	2	42.78	3	23.15	1-+
72.01	2	53.21	1+	44.54	1	24.48	1+
73.66	2	54.18	1	45.89	1	25.46	1+
76.03	2 Au?	54.64	1	46.38	3	27.94	8
78.74	1	55.40	2	48.38	1	31.59	2
79.08	1	55.74	2	49.65	1	32.79	1
80.16	1	57.37	1	51.09	1+	33.68	1
82.24	1	58.72	3 r	51.55	2	35.39	1
86.50	1	61.12	1	52.07	1	37.44	1
87.24	2	63.49	2	54.27	2	38.19	2
91.85	2	64.66	1	57.40	1	41.67	4
95.14	2	65.37	1	59.10	1	46.00	2+
96.14	1	66.05	1	60.07	2	46.24	2
97.14	3	66.29	1	61.22	3	47.02	2
98.95	3	68.21	3	64.45	2	51.04	6
2700.25	1	69.72	1	65.73	2	54.15	1
02.28	3	73.30	3	66.78	1	54.65	1+
02.60	2	79.45	2	68.63	3	54.85	1+
06.49	1	79.81	2	70.77	1+	55.59	1
07.91	1+	80.36	3	74.66	2	57.01	1
14.29	1+	80.73	1	75.50	4	61.76	1
14.76	1	82.46	2	77.09	5	63.48	1
15.44	1	90.70	1	77.93	1	63.82	1
15.53	1	91.86	2	78.86	1	65.63	2

2968·45	1 +	3043·38	1	3112·21	1	3180·40	3
70·61	1 +	44·87	2	12·50	1 +	81·51	1
72·70	4	45·65	1	12·77	1 +	82·18	1
73·60	1	48·22	3	13·23	1 +	84·31	1
74·22	3	49·65	1 +	15·65	1	87·57	3
74·67	1	51·50	1	16·45	2	89·35	1
77·79	3	51·81	1	19·50	1	89·63	1
79·05	1	52·16	1	21·02	1 +	91·21	4
80·01	1	52·85	1	21·50	1 +	91·55	2
80·85	2	53·20	3 d?	21·80	1 +	94·46	1 +
81·76	2	53·76	1	22·11	1 +	95·08	5
82·21	2	54·28	1	22·77	2	96·25	1
83·26	1	55·65	2	27·64	4	98·32	1
85·16	1	56·73	2	28·50	1	3200·63	2
87·40	2	60·54	1 +	29·02	1	01·61	1
88·80	1	61·29	1	29·48	1	03·46	2
88·88	1	61·38	1	29·78	1 + d	04·45	1 +
90·40	4	62·10	1 +	30·92	8	05·09	1 +
92·06	1	63·27	1	32·22	1 +	06·43	3
92·16	1	63·94	2	32·89	1 +	06·94	1
94·83	4	64·68	3	33·12	2	07·44	1
96·60	1	65·40	2 d?	34·46	1	10·27	2
98·32	1	66·24	1	35·54	1	15·35	1
3000·23	1	69·16	2	36·04	1	15·70	4
02·31	1	69·82	2	37·08	2	16·30	1
05·26	1	71·04	2	40·61	2	17·38	2
05·86	1	71·34	1	44·47	1	17·94	2
10·50	1	71·70	2	45·51	4	18·86	1
10·81	1 +	72·54	2 + d	46·02	1	21·02	2
12·66	1	73·41	2	47·00	1	21·24	2
14·56	1	77·01	3	48·80	1	22·91	2 +
15·37	1	80·51	2	50·53	1	23·03	2 +
19·02	1	81·93	1	51·97	3	23·43	2
19·92	1	83·00	1	52·29	1	24·54	1
22·87	2	84·52	1	52·88	1	25·29	1
24·87	3	85·06	1	54·07	1	25·57	5
28·01	1	88·00	1	54·93	1	29·67	2
28·56	4	94·32	10	55·63	1	30·35	1
28·79	1	96·61	2	59·39	1	36·56	3
29·30	1 Au?	97·25	1 +	59·95	1 +	37·33	1
29·90	1	98·59	1	63·24	1	37·85	1
32·88	3	99·30	3	63·50	5	38·18	1 d
33·49	1	3101·10	1 +	70·29	1	42·66	1 +
35·11	1	02·02	1	71·29	1	43·46	1 +
39·28	1	03·36	1	71·54	1	46·89	2
39·51	1	07·11	1	72·65	2	47·59	1
39·80	2	09·83	1	73·32	2	48·32	1
39·91	2 +	10·95	1	73·78	1 +	49·06	2
41·48	1	11·57	3	75·91	2	49·62	3

3251.42	1	3298.45	1	3357.15	3	3399.84	2
51.67	1	99.10	1	58.03	1	3400.10	1
51.78	2	99.75	3	58.52	10	01.35	1
53.48	1 +	3301.65	1	60.00	1	03.15	2
54.15	3 r	02.32	1	61.05	1	03.86	2
54.98	1	03.46	1	61.37	4 Ti?	05.52	4
57.61	1 +	04.91	1	62.00	1	06.24	3
59.25	1	04.99	1	63.00	1	06.73	1
60.25	3	05.26	1	63.89	1	08.09	1
60.68	3	08.18	3	65.71	2	08.48	3
62.01	2	08.90	1 +	66.04	1	08.80	3
63.48	2	09.95	1	67.11	4	09.29	3
63.93	1	10.23	1	67.51	2	10.02	2
64.71	3	10.58	3	68.55	1	13.03	3
65.45	1	11.50	2	69.75	2	13.62	1
66.16	1	12.74	4	69.99	2	14.16	2
66.55	2	15.33	4	71.46	3	16.09	3
67.17	2	19.09	3	71.56	3 Ti?	17.99	2
67.83	1	19.38	3	72.26	2	20.75	2
69.28	1 +	19.70	3	72.72	1 +	21.30	1 +
69.64	1 +	21.93	1	72.96	3	23.89	3
70.56	3	23.06	3	74.40	2	25.57	4
70.88	3	26.74	4	75.06	3	25.98	3
72.14	5 r	28.05	1	76.47	2	26.69	3
73.20	1 +	29.50	4	76.87	2	27.60	4
73.64	1	29.72	1 +	79.40	1 +	28.49	1
76.07	1	32.02	1	80.20	2	28.90	1
76.65	1 +	32.29	3	80.59	4	29.19	3
77.77	3	32.83	1	81.04	3	31.20	1 +
78.40	1	34.08	1	83.89	3	32.10	2 +
79.36	1	35.53	1	84.80	2	32.55	2
79.96	1 +	36.44	1	85.80	2	32.85	2
80.08	1	39.31	2 d	86.38	2	33.24	3
82.45	1 +	41.71	2	87.13	1	37.00	1
83.09	1	42.08	10 r	87.72	1 +	37.10	1
83.57	3	43.81	6	87.93	2	38.36	1 Zr?
85.78	3	44.08	2	89.08	1	39.46	1
87.71	3	46.88	2 +	90.57	1 +	40.05	2
88.03	3	47.05	2	90.78	2	40.76	3(Fe)
89.60	1	47.66	1	91.49	2	42.79	2
90.15	2	49.17	6 v	92.13	1 Zr?	42.90	1
91.18	2	49.56	5	92.48	4	44.43	1
92.12	3	50.80	1	94.26	1	45.79	2
94.50	2	52.40	2	94.71	2	48.33	1
96.16	4	52.72	2	95.10	1	50.92	1
96.63	1	53.00	1	96.07	3	52.48	2
97.20	1	53.65	2	96.50	1	52.79	1
97.44	1	54.82	5	98.37	2	54.84	1
97.82	1	55.54	1	99.54	3	55.05	1

3456·65	2	3505·93	1	3556·14	1	3616·33	1
57·10	1 +	06·15	1 +	58·15	1	16·62	1 +
57·92	2	07·12	1	59·25	2	17·81	2
58·90	1 +	08·08	4	59·60	1 +	18·54	2
59·07	2	08·64	1	61·29	1	19·00	2
59·81	2	09·45	1 +	63·71	15 d	19·32	1
60·80	1	10·40	3	66·24	1	19·60	3
61·65	1	11·30	2	68·65	1	19·82	2 +
62·77	2	12·90	1 +	68·89	2	21·15	3
63·16	2	15·54	3	69·60	3	23·99	1
63·90	4 d	16·31	2	72·62	1 Zr?	24·50	1
65·98	3	16·98	2	73·15	1 +	25·29	2
67·59	2	17·24	1	75·27	2	25·84	2
68·67	1	17·80	3	76·00	10	27·99	1
69·27	1	18·30	1	77·85	3	30·76	2
69·56	2	19·47	1	80·42	15	33·12	2
70·40	1 +	19·75	1	80·97	1	33·47	1
71·36	2 +	20·19	3	82·50	2	33·85	2
71·66	1	20·85	2	85·10	4	34·57	2
73·20	3	23·30	1	89·23	5	35·44	1 +
74·15	1	25·08	1 +	89·49	5	35·95	1
75·75	2	25·36	2	90·10	1 +	37·09	2
76·13	1	26·02	1	90·88	1 +	37·66	2
77·33	1	27·23	1	91·06	1	37·98	3
78·13	1	27·40	1 +	91·35	1	38·89	2
78·47	1	28·09	1	91·95	1	39·44	3
78·84	5	30·23	1	94·10	6	40·79	2
79·69	3	30·97	1	97·28	1	43·45	1
80·35	1	33·79	3	97·66	1	43·85	2 +
81·20	2	34·23	2	98·47	1	45·05	2
81·40	1	35·43	10	99·41	2	45·49	1
84·19	2	37·65	10	99·76	3	47·42	1 +
84·75	1	39·76	2	3601·35	1	49·98	4
85·22	1	41·13	3	02·70	6	50·91	3
86·06	2	41·38	1 +	03·60	1	51·31	3
86·86	1	42·06	2	04·15	1 +	53·62	4
88·91	1 +	42·70	2	04·80	1	54·54	1
89·21	2	43·11	2	06·42	1 +	56·09	2
91·19	5	44·15	8	06·64	1	57·24	2
91·62	2	44·79	5	06·94	1	58·04	1
93·62	1	46·18	1 +	07·46	1	58·80	2 +
96·15	1	46·60	1	08·15	1	59·73	3
96·81	1	47·80	1 Zr?	08·46	1	60·51	5
97·92	3	48·25	2	10·89	1	61·81	2
98·75	10	49·38	2	11·43	1	62·18	2
3500·10	1 +	50·39	1	12·80	1	63·35	1 +
00·22	1	50·58	5	13·15	1	64·85	8
03·32	2	51·23	1	13·58	1	65·29	1
05·02	1	54·74	15 d	15·61	3	66·66	2

3667.10	2	3717.16	8	3776.75	1	3884.66	1
67.82	2	17.65	3	77.41	1	85.59	5
68.75	2	18.61	1	77.80	1	85.87	4
69.15	3	19.01	1	81.21	5	86.22	2
69.85	2	20.58	3	81.55	2	86.42	1
71.50	2	21.40	1	84.02	3	86.82	1
71.85	1 Ti?	21.65	2	85.48	2	89.86	1
72.58	2 +	22.45	2	86.35	2	89.95	1
73.37	1	23.10	2	87.26	20	90.48	1 Zr?
74.91	4	25.35	1 +	87.62	1	90.94	1
75.45	1 +	26.40	20	89.65	1	91.51	4
76.44	2	27.36	2	90.30	15	92.49	1
77.21	2	31.69	1	91.43	20	92.93	1
77.91	2	32.19	2	93.04	1	93.00	1
81.82	1	33.76	2	93.96	2	93.49	1
84.09	1 +	38.61	4	94.59	5	93.89	3
84.38	1 +	40.00	20	95.70	2	94.23	5 r
85.31	3	40.99	10	96.73	2	94.85	1
86.70	1	41.45	1	98.29	10	96.05	3 r
88.09	2	41.97	3	99.32	1 +	98.16	1
88.30	2	42.60	20	3801.10	2	98.45	2
88.84	2	44.18	3	03.13	20	98.70	2
89.16	2	47.09	2	04.06	8	99.08	1
91.32	1	48.70	2	04.89	8	99.38	2
93.50	3	50.35	1	06.31	2	3900.67	1
94.80	3	50.78	1	09.25	2	00.98	1
96.02	2	51.45	1	10.64	10	03.13	1 +
96.81	1	51.65	1	11.17	3	04.32	2
97.16	1	51.89	1	12.19	3 +	07.05	2
97.53	2	53.34	3	14.99	1	08.73	1
98.00	10	55.44	1	15.61	3	09.11	3 r
99.70	1	55.91	3	18.97	1	09.75	2
3700.05	2	59.73	10	19.32	6	13.15	2
02.11	1	60.77	1	25.01	4	13.28	1 +
03.30	2	61.26	2	29.57	2 +	13.59	1
04.04	2	63.62	3	31.99	3	14.87	10
04.29	2	64.24	2	35.31	3	17.13	1
07.95	1 +	65.22	3	36.61	4	19.14	2
09.02	1	66.70	3 r	41.93	3	19.29	2
09.57	3	68.89	2 +	46.09	3	19.85	2
10.56	2	69.30	2	53.58	2	20.38	6
11.50	4	70.15	2	54.75	2	20.87	1
11.90	2	71.03	2	59.06	3	21.80	1
12.68	1	71.99	3	63.51	3	22.46	2
13.21	20	73.33	2	68.04	2	23.94	1
13.93	3	74.22	2	75.91	2	24.64	2
14.97	1	74.61	1	77.08	2	25.14	3
16.10	1	74.74	1	77.65	3	25.30	1 +
16.33	2	75.60	2	78.98	3	26.76	2

3929·45	3	3994·56	1	4044·86	2	4094·27	1
31·64	1	97·30	1	46·45	1	94·49	1
33·19	1	97·52	1	48·13	1	95·26	1
33·57	1	98·36	1	48·78	1+	95·70	1
34·30	1	98·59	1	49·90	2	96·08	1+
34·56	2	99·31	3	50·15	1	97·03	1+
35·59	2	99·85	1	51·68	2	97·80	1+
36·18	1+	4000·74	2	52·30	1+	98·37	1
36·60	2	01·26	2	53·35	1+	99·06	1+
37·68	10	02·40	1	55·32	1	99·25	4
38·13	2	06·07	1+	56·00	1+	4100·05	1+
41·45	4 r	08·41	2	57·06	1	00·55	4
43·83	5	08·88	1	57·42	1+	01·14	30
47·64	2	09·05	1	59·14	50	02·89	1+
47·85	1	09·83	2	59·65	2	04·31	1
49·45	1	12·20	1	59·80	1	06·34	2
49·57	1	12·30	1+	59·97	1	06·94	1
52·49	2	13·41	2	60·47	2	10·04	2+
53·16	2	14·08	1	60·97	3	10·49	1+
53·65	1	15·05	1	61·40	1	12·30	2
55·80	2	16·20	2	61·69	2	13·51	1
57·01	1	17·66	2	62·12	1	14·10	3
59·30	1	20·36	1	64·95	1	14·30	1+
59·50	2	21·15	1	66·26	1	17·06	4
60·14	1	22·52	1	67·32	2	19·44	2
60·79	1	23·29	2	68·41	3	22·96	2
61·15	1+	23·43	1	69·32	1	24·01	20
62·31	1	24·40	1+	70·18	1	25·39	2+
64·84	1	26·01	1	71·13	2	25·75	1
65·84	4	26·52	1+	72·25	1	26·33	1+
66·39	20	26·84	1	73·25	1	27·05	1+
70·25	1	27·07	1	73·72	1+	27·61	1+
70·84	2	27·45	2	73·82	1+	29·60	8
72·07	3 r	28·10	2	74·52	1	30·12	10
72·68	3 r	29·35	1	76·24	1	31·70	1+
73·80	2	30·49	1	77·23	1	34·78	3
75·35	1	32·72	20	77·53	1	35·56	1
76·78	2	33·34	8	78·48	1+	37·30	15
78·09	2	34·67	1	78·72	1+	37·77	1+
78·90	2	35·24	1	79·88	30	38·45	1+
79·52	2	36·05	1	83·95	1	39·22	1+
80·67	4	37·48	1+	84·34	1	39·58	3
82·20	1+	38·31	1	85·02	3	39·89	20
84·95	1	39·22	2	86·77	2	42·43	1
85·22	1	39·69	6	88·21	1	43·37	3
85·30	1	40·60	1	90·31	3	46·13	2+
88·30	2	42·71	2	90·95	1	47·35	2
90·81	1	43·29	2	91·70	1+	48·89	2
91·82	2	44·25	2	94·09	1	50·33	5

4152.22	2 +	4216.35	1	4278.34	1	4331.60	10
52.81	20	18.14	20	79.61	2	32.60	1
55.00	1	20.75	1	79.83	2	36.70	1
56.43	1 +	22.83	1	80.79	4	37.70	1
56.90	1 +	24.85	1	81.27	1	37.79	1
58.18	3	26.36	2	81.50	1	38.08	1
60.99	2	27.63	1	82.85	1	38.85	1
61.41	2	27.87	1	85.13	1	38.94	1
62.99	2	28.85	1	86.35	2	39.59	2
63.64	2	29.31	10	87.14	4	42.63	1
63.80	20	29.98	3	88.43	1 +	42.99	3
64.81	15	30.48	3	89.62	4 r	45.48	3
66.00	2	32.11	4	90.37	1	45.67	1
66.18	1 +	37.15	1	91.41	3 r	46.26	2
68.30	20	37.95	2	92.19	3	47.47	2
69.74	5	39.46	1	92.70	4	48.05	1
74.11	3	40.50	1	94.78	1	48.80	3
74.51	2	41.25	1	94.95	1	49.19	3
75.03	1	41.35	1	95.70	2	50.46	2
77.07	1	41.61	2	96.39	3	51.80	10
79.92	2	41.84	1	98.09	1	52.45	1 +
81.50	2	42.80	3	99.81	8	53.43	2
84.60	4	46.44	3	4301.35	15	54.20	1
86.24	2	47.84	1	03.06	1	54.36	1
90.20	2 +	48.80	2	04.02	2	54.97	1
90.83	2	49.11	1	04.80	1 +	55.40	1 +
91.09	20	49.62	3	06.46	2	57.01	2
92.23	10	53.20	5	07.40	1	59.97	2
94.00	2	53.89	4	08.27	2	60.10	2
95.29	8	54.55	1	08.84	2	60.66	2
95.81	2	54.90	3	09.73	3	61.82	1
97.78	2	55.66	5	10.99	1	66.60	2
98.62	3	56.11	1	11.49	8	67.55	1
99.02	1	56.46	1	11.88	2	67.75	1
4201.15	2	58.01	1	12.29	1	68.11	2
01.70	4	59.06	2	12.61	3	68.62	8
03.56	2	60.81	1	13.05	1 +	69.77	2
04.45	2	61.87	2	14.05	2	70.53	2
05.50	20	62.30	8	14.45	1	72.84	1
06.26	2	64.76	1	16.63	2	74.98	2
08.29	4	66.21	8	18.16	2	75.43	2
09.59	1	68.81	3	19.31	1	76.88	1
12.19	2	70.86	5	20.99	1	77.38	1
12.67	2	73.12	1	22.08	1	78.12	10
13.39	2	73.50	1	23.64	2	79.69	2
13.64	1	74.80	2	26.54	20	80.87	1
14.91	15	74.99	1 +	27.58	3	81.31	1
15.64	1	76.57	1	28.60	3	82.69	1
16.05	1	77.62	3	29.91	2	84.05	2

4385.03	2	4446.00	2	4511.28	3	4589.18	1
86.46	1	46.37	3	12.32	1	92.63	1
87.91	2	47.40	10	13.63	1+	99.63	1+
88.53	3	48.22	1	17.07	1+	4600.39	4
89.66	1	50.08	1	19.19	1	03.04	2
91.40	1	51.09	2 Ti?	21.04	1	03.97	2
91.79	1	53.50	2 Ti?	22.42	1+	05.82	1
92.90	3 d?	53.86	1 Ti?	22.75	1	06.96	10
94.10	1	54.00	2+d (Ca)	23.61	8	08.71	2
94.41	1	56.50	1+	23.90	2	10.28	1
95.22	1 Ti?	56.97	3	24.30	2	10.85	2
97.20	2	58.26	3	27.81	1	12.23	2
99.97	1	59.83	1	29.56	1	12.59	1
4400.55	2	60.35	2	30.57	1	14.88	2
01.01	2	60.61	3	31.63	1	16.30	8
01.35	1	64.31	3	42.03	1+	18.55	1
02.23	2	65.39	1	42.40	1+	19.55	1
04.09	1	66.08	1	42.95	2	20.19	1
06.70	2	66.34	1	43.83	1+	21.85	1
10.40	10	66.59	1	47.00	10	22.50	2
11.05	1	68.08	1+	48.00	1	24.74	2
11.69	3	68.66	1	50.85	1	25.51	1
12.33	1	69.49	2	51.20	1+	26.13	1
13.16	1	69.89	4	51.70	1	27.61	2
15.01	1	71.49	5	52.10	1	28.81	1
16.52	2	72.72	4	54.01	3	30.30	10
17.01	1	75.44	1	57.02	2	32.15	1
17.41	1	76.11	1	59.60	1	32.41	1
17.86	1	76.65	1	62.53	1	33.10	1+
19.61	5	77.73	1	63.95	1	33.95	1+
20.00	2	78.25	1	64.38	1	36.89	1
20.61	2	79.82	1+	64.73	8	38.26	3
20.80	8	80.54	1	67.30	1	39.79	1
21.45	1	81.61	1	67.53	1+	40.40	2
21.88	1+	83.05	1	69.33	1+	43.48	3
24.03	2	84.97	1+	69.70	1+	43.87	2
26.83	3	89.47	1	71.15	1	44.00	2+
28.75	1	90.53	1	72.15	1	45.55	1
29.61	3	91.24	1	73.30	20	47.09	3
33.07	1+	93.15	1	74.52	1	47.67	1
33.68	1+	94.72	2	75.02	3	49.10	6
36.05	1	97.45	1	75.54	2	49.42	3
36.85	1	98.33	1 d	79.61	1	49.79	1
37.41	20	4500.00	3	81.85	10	50.13	1
38.05	1	00.68	1	82.46	3	50.88	1
39.51	1+	01.47	1	83.06	1	51.38	1
41.98	2+	03.23	4	83.31	1	52.29	1
43.95	1	03.60	2	83.70	1+	53.00	1
44.41	1	08.60	3	85.02	1+	53.55	1+

4655.00	1	4708.40	10	4773.00	2	4842.31	3
56.11	1	12.05	2	73.44	4	45.33	3
58.30	2	13.20	3	76.30	2+	45.65	1
60.35	1	13.63	5	77.81	2	47.60	1
61.11	2	15.98	3	79.95	1	48.45	4
63.99	10	18.22	3	80.28	1	48.59	3
64.53	1	20.25	1	81.18	1+	49.52	1
65.48	2	23.29	1	81.75	1+d	52.06	2
66.38	3	23.96	3	83.12	2	52.48	2
66.79	1+	26.90	1	84.50	2	54.10	1
67.37	3	27.46	3	85.87	3	57.50	1+
68.38	2	30.49	3	87.81	2+d?	58.03	1+
69.40	1+	33.61	3	90.15	3	58.67	1+
70.00	2	34.03	5	90.73	2	61.16	1
70.25	1	35.50	3	91.10	2	62.10	1+
71.02	1+	36.60	2+	93.25	2+	63.70	1+
72.25	20	40.78	3	94.85	1+br	65.40	1+
73.74	2	42.25	1	96.75	1+	66.16	1+
74.51	1	42.60	2	98.45	1+	67.00	4
75.53	20	44.00	3	99.00	1	67.90	1+
78.60	4	44.79	3	4802.61	3	68.47	1+
80.15	1	45.20	2	04.10	1+br	69.16	5
80.63	1	47.15	3	05.30	1	70.30	1
81.03	2	48.20	2+	05.76	1	70.51	1+
81.72	2+	49.02	2	06.79	1	70.98	1+
82.79	2	49.78	3	07.21	3	72.69	2
83.15	2	49.97	3	09.20	2	73.38	1+
83.81	1	50.95	1	09.50	3	74.33	1+
85.28	4	51.61	3	10.75	10 d?	76.00	1+
85.68	2	52.30	1	11.48	3	78.20	1
86.05	2	53.02	1	12.28	1+	78.69	2
87.31	1+	53.68	1	13.68	1+	79.38	2+
87.90	1	55.10	2	15.18	2	80.88	3
88.61	1	55.54	3	16.51	10	81.85	1
88.97	1	56.75	2	20.21	1+	83.30	1+
89.30	1+	59.40	2 d? (Ti)	21.27	1	85.91	2
92.28	1	60.80	1+	22.10	1+	86.49	1
94.63	3	62.26	1+	22.45	1+	89.69	2
95.59	3	63.75	1+	24.30	1+	90.00	1
96.05	1	64.00	1+	25.12	3	90.93	5
96.77	1	65.23	1+	27.12	1	92.68	3
97.60	3	66.70	2	29.43	4	95.75	3
97.90	2	67.00	3	30.84	1+	97.69	2
4702.15	2	67.31	1	32.35	1+	98.64	2
04.05	2	68.40	1+	33.52	5	4900.96	3
04.77	1	69.83	1+	35.75	1+	02.00	1
05.20	2	71.39	1	37.80	3	03.20	1
06.28	10 d	72.03	3	38.20	3	04.71	3
07.26	1	72.43	1	40.50	1+	08.50	1

89	2	4994.48	3	5061.20	1	5145.79	1 +
31	1	96.28	1 +	64.59	2	46.20	1 +
20	1 +	96.76	1	65.42	3	47.70	3
10	5	97.26	1	66.18	1	48.15	1
84	1	98.03	3	68.40	2 +	49.37	1
01	2	5000.85	2	69.10	1	49.80	1
53	3	01.12	3	70.85	1 +	50.80	3
93	1	02.41	3	71.80	3	51.10	1 +
93	1	08.20	2	72.70	2	52.34	1
02	3	11.90	2	76.14	3	52.79	3
13	3	13.42	3	77.59	3	53.20	2
73	2	17.49	2	79.12	8	53.79	2
30	1	17.91	5	79.51	1	57.31	1
36	2	18.73	1	82.50	1	57.68	2
35	2	19.67	3	84.23	1 +	58.21	2
61	2	20.53	1	85.09	3	60.51	8
16	2	20.94	1	86.06	1	61.81	1
10	2 +	26.53	4	87.00	2	64.53	10
55	3 +	27.98	1	88.56	1 +	66.44	1
73	1	28.80	2	89.01	3	67.15	1
30	3	29.81	2	94.59	3	67.57	2
7	2	30.29	3	95.48	15	74.38	2
55	3 + d?	31.20	1 +	96.74	1	74.75	1
00	1	32.03	3	97.91	2	78.38	2
0	2	33.50	1	99.03	2	80.49	5
8	2	34.50	1	5100.33	5	82.97	1
2	4	34.89	1	01.02	1	83.48	2
8	5	35.68	1	01.69	1 +	84.00	2
5	1	36.13	3	02.16	1	87.13	4
4	1 +	37.54	1	02.54	3	88.20	1 +
0	3	38.07	2	05.06	1 +	89.33	4
0	4	39.22	8	05.70	2	89.96	1
9	3	41.57	1	08.80	1	90.40	1
0	2	41.95	1	11.10	3	92.00	1
3	1 +	42.75	1 +	13.61	1	93.20	5
0	1 +	43.20	2	16.89	3	93.63	2
1	1 +	43.65	2 +	18.22	2	94.76	1
0	1 +	44.16	2	20.48	5	96.00	4
3	1	46.92	2	21.96	4	97.50	2
1	1 +	48.13	3	24.84	3	98.79	1
1	1 +	49.71	1	25.45	2 +	5201.21	2
1		50.08	1	27.81	3	01.70	1 +
1	1 +	51.80	2	28.44	2	02.10	2
1	1 +	53.12	1 +	29.89	2	02.50	1
1	1 +	54.39	2	33.48	3	02.80	1 +
5		54.84	3	34.90	5	03.34	3
2		55.81	3	35.62	2	04.17	2
2		58.19	5	37.52	3	04.66	2
1		59.52	3	40.78	4	05.36	3

5205.65	1	5298.28	2	5376.10	1+	5483.70	2
06.18	2	99.11	2	76.91	1+	91.28	1
06.52	1+	5301.60	2+	77.99	2+	94.35	1+
07.80	2	03.42	2+	80.87	2	99.76	2
08.60	3 Cr?	05.29	1	81.52	3	5501.99	1
10.53	3 Ti?	06.54	2	83.03	1	04.81	4
11.40	3+	06.78	1	84.20	1+	09.35	2
18.61	1+	07.16	1	88.49	2	10.93	1+
19.25	5 d	08.08	1+	94.57	2	11.55	1+
25.30	3	14.47	2+	95.67	1	13.05	3+
29.51	2	15.71	3	96.05	2	14.75	1+
30.09	2	17.19	2	96.52	3	17.61	1
31.50	1+	17.99	2+	5400.75	1+	18.40	1+
31.96	1+	18.79	5	02.70	1	18.65	1+
32.99	4	19.65	3	03.26	1	22.14	1
34.60	1+	20.38	2	04.65	1+	23.80	3
35.25	3	21.50	2	09.63	1	26.50	1+
36.47	1+	21.83	1	10.00	1	32.82	2
36.99	2	22.15	1+	11.45	2	39.00	1
37.57	5	23.51	2	16.50	2	41.70	2
40.52	3	26.51	2	22.63	3	45.75	1+
41.65	3	28.20	1+	28.05	1+	49.88	1+
44.00	1+	34.46	1+	31.48	3	50.40	1
47.50	4	35.03	4	32.70	1	51.60	3
51.25	1+	36.99	3	34.70	1+	52.55	1
51.81	8 d?	38.05	2	37.50	5	53.34	1
53.18	3	40.15	1+	43.30	2	63.20	3
54.09	3	40.98	3	44.02	1+	66.35	1
55.66	2	43.79	2	45.90	1+	71.63	3+
60.29	3	44.38	20	48.53	2	72.75	1
60.99	2	46.75	1+	53.02	1+	76.35	3
64.34	1	48.50	1	53.25	1+	78.32	1
65.8	1+ br	49.00	1	56.36	2	78.50	2
67.90	1+	50.96	10	57.85	1	87.19	3
70.06	2	51.27	2	58.26	3	91.22	2+
71.70	8	53.49	3	61.12	2	95.10	1
72.60	3	55.30	1+	62.50	1+	97.10	1+
76.30	10 d	55.51	2	67.05	1+	99.81	2
77.58	2	55.89	2	67.59	1+	5603.72	3
78.70	2	59.40	3	68.26	2	04.19	2
79.57	3	61.80	1	69.74	2	06.60	1
81.75	1	62.21	2	72.10	1+ br	18.89	1
85.43	8	63.29	2	73.49	1	20.0	1+ br
87.23	1	63.50	1+	76.28	2	28.45	2
88.70	1+	68.60	2	77.53	1	29.38	3
93.47	2+	69.50	1+	78.97	1	30.05	1+
94.65	1	71.27	2	79.44	1	35.65	2+
95.85	1+	72.53	1+	81.21	2	42.31	3
96.50	3	75.42	3	83.30	1	45.51	2

5648·63	1 +	5765·21	3	5874·97	3	6148·31	2 +
54·28	1	71·29	2	75·52	1	64·52	2
62·25	1 +	75·07	1 +	78·02	2	74·61	1
64·89	4	76·20	2	79·24	1	6204·99	2 +
65·80	4	76·40	2	86·23	1	13·29	1
67·03	2	80·05	1	93·71	2	22·12	2
71·27	5 d	80·56	1	5900·85	10 d	52·00	2
72·09	3	87·75	4	04·10	2 + d	61·00	2
76·12	1	90·00	1	04·78	1	69·00	1 +
77·62	2	90·90	1	16·35	1	86·65	2 +
84·67	1 +	94·48	3	27·68	2	6312·40	2
93·28	2	5801·25	1 +	28·42	1 +	19·39	1
98·18	2	02·05	1 +	28·60	1 +	26·02	1
5706·40	2	04·27	3	34·42	2 + d	46·49	1
06·70	3	10·95	1 + br	42·54	1	49·20	2
08·70	1	12·18	1 +	50·20	1	76·20	1
09·59	3	15·59	2 +	57·98	2	6430·71	10
12·29	1 +	19·70	3	83·50	3	33·49	4
13·68	1	20·89	2	86·39	2	50·10	1
14·05	1 +	35·14	3	86·89	1	98·09	1
15·82	1	38·40	2	98·03	2 +	6544·92	4
16·59	3	38·90	4	98·25	2 +	6614·43	1
22·97	1 +	42·75	3	6028·99	2 +	60·99	3
25·90	2	46·35	2 + d	29·99	2	61·21	3
29·39	4	50·97	1	32·09	2	77·59	5 d?
37·57	1	53·10	1	45·75	2	6701·49	2
38·41	1	56·00	1	49·00	1	23·90	3
43·56	1 +	57·00	1	56·90	2	40·19	2
44·08	1 +	62·42	1 +	6103·75	1 +	6828·40	2
51·65	3	63·51	1 +	07·94	2	76·75	1 +
53·51	1 +	64·40	1 +	11·20	1	6908·40	1 +
54·73	1 +	64·75	1	14·10	1 +	18·70	1 +
58·38	1 +	65·23	1 +	42·70	1	90·67	1 +
59·25	1 +	66·75	4	44·12	1 +	7047·2	1 + br
60·58	4	69·20	2				

Kanten.

Von 5800 ab im Hintergrund Banden ohne angebbare Kanten.

6474·20	K. R.	6495·20	K. R.	6576·3	K. R.	6591·4	K. R.
84·60	K. R.						

XLIII. Nd. Neodym.

Ältere Messungen: M. Bertram, Diss. Bonn (1905). J. M. Eder und E. Valenta, Wiener Akad. 119 IIa. (1910) (Rot).

Material: Neodymnitrat von Dr. C. Auer von Welsbach, auf Gaskohle.

Verunreinigungen: Sa, Pr, Eu.

Linienzahl: 2762.

2962.97	1	+	3201.90	1	3274.14	1	3339.55	1
63.67	1		03.59	1	75.34	2	42.05	1
93.30	1		04.22	1	75.81	1	43.47	1
3008.07	1		05.10	1	75.97	1	45.20	1
14.26	1		05.72	1	76.24	1	45.63	1
18.44	1		11.10	1	80.34	1	45.81	1
52.25	1		13.59	1	80.61	1	46.71	1
56.79	1		17.23	2	81.65	1	46.96	1
69.87	1		17.45	1	82.95	1	47.68	2
71.60	1	+	22.66	1	85.24	2	48.01	2
75.51	1		22.94	1	86.74	1	48.25	2
79.52	1		23.19	1	87.96	1	49.06	1
80.28	1		23.69	1	89.66	1	50.66	1
81.10	1		23.90	1	90.19	1	51.33	1
92.99	2		24.40	1	90.80	1	51.98	1
98.55	1		28.15	1	92.46	1	52.35	1
99.62	1		29.30	1	93.17	1	53.52	1
3105.52	1		31.47	1	93.96	1	53.72	2
05.61	1		31.83	1	94.81	1	54.75	1
06.27	1		34.10	1	98.74	1	55.79	1
08.10	1		34.75	1	3300.28	2	56.03	2
15.30	2		34.93	1	01.05	1	56.66	1
16.25	1		38.05	1	04.76	1	58.29	1
19.85	1		38.40	1	05.25	1	59.89	2
23.19	1		39.88	1	05.41	1	61.68	1
24.18	1		45.66	1	07.91	1	61.90	1
24.66	2		46.50	1	08.10	1	64.49	1
27.20	1		47.41	1	10.49	2	65.05	2
33.74	2		51.01	1	11.05	2	66.96	1
35.00	2		51.94	1	12.89	2	69.19	1
37.35	1		53.43	1	13.26	2	69.70	1
41.63	1		54.20	2	16.12	2	73.44	1
42.55	1		55.18	1	18.54	1	75.05	1
44.68	1		56.26	1	19.15	1	75.26	1
44.96	1		56.93	1	20.52	1	75.76	1
48.63	1		57.04	1	25.28	1	76.59	1
49.41	1		59.37	2	26.02	2	78.00	1
49.65	1		59.58	1	26.36	1	79.90	1
55.87	1		60.79	2	27.28	1	82.23	1
59.30	1		63.56	1	27.69	1	82.95	1
62.75	1		64.53	1	27.80	1	84.81	1
76.09	1		65.25	2	28.16	1	86.40	1
79.03	1		65.51	1	28.40	3	86.61	2
81.65	1		67.38	2	30.20	1	87.30	1
88.84	1		67.82	1	31.70	2	88.12	2
91.63	1		71.60	1	32.32	1	89.42	1
93.19	1		71.73	1	33.17	1	92.42	1
3200.00	1		72.30	1	34.59	2	93.76	2
00.75	1		73.30	2	39.17	2	95.46	1

64	1	3485.05	1	3555.89	2	3609.60	1
45	1	85.14	1	56.45	1	09.92	3
53	1	86.96	1	58.70	1	10.90	1
47	1	87.10	1	59.25	1	11.05	1
29	1	87.99	1	59.85	1	12.79	1
58	1	95.62	1+	60.87	3	14.09	1
53	1	96.15	1	61.75	1	14.80	1
10	1+	97.32	1	63.52	1	15.93	3
35	2	99.22	1+	68.45	1	16.46	1+
15	1	99.70	1	69.04	3	16.88	1+
52	1+	3500.10	1	72.51	1	17.18	1
41	1	01.70	1+	72.93	1	17.84	1
66	1	01.93	1+	73.36	1	18.09	1
21	1	02.16	1+	74.50	1	18.90	1
40	1	04.18	1	76.29	1	19.09	3
35	2	05.42	1	77.55	1	20.34	1
05	2	10.83	2	80.30	1	20.89	1
11	1	12.86	1	80.60	1	23.35	1
56	1	15.19	1	80.70	1	23.73	1
75	1	19.00	1	82.75	1	24.78	2
38	1	19.90	1	83.01	1	26.33	1
70	1	20.08	1	83.53	1	27.02	1
73	1	22.17	2	86.97	1	27.55	1
30	1	23.09	1+	87.64	3	27.87	1
21	1	23.75	1	88.37	2	28.71	1
33	1	27.65	2	91.78	1	29.75	1
45	1	28.35	1	92.20	1	30.08	2
74	1	29.36	1+	92.71	3	31.16	2
76	1+	31.95	1+	93.28	1	33.62	2
52	1	32.90	1	93.71	1	34.41	3
68	1	33.74	2	94.33	1+	34.98	2
14	1	34.68	1+	95.25	1	35.23	1
13	1	36.20	1+	95.55	2	37.10	2
93	1	36.58	1+	96.05	1	37.36	2
07	1	36.80	1+	98.14	3	37.90	2
71	1	37.60	1+	99.22	1	38.19	1
99	1	38.96	1	99.54	1+	38.85	1+
06	1	39.30	1	3600.26	1	39.30	1
30	1	39.48	1	01.06	2	40.35	2
54	2	41.72	2	01.46	1	40.70	1
00	2	43.46	3	01.70	1	41.22	1
23	1	44.22	1+ br	01.97	1	41.61	2
52	1	45.05	1+	06.45	1	42.58	1+
56	1	49.00	1+	06.52	1	42.74	1
33	1	49.45	1+	06.87	1	43.72	2
65	1	53.00	1	07.26	1	44.21	1
00	1	53.40	1	07.64	1	44.77	1
16	1	53.70	1	07.86	1	45.29	1
49	1	54.15	1	08.06	1	45.72	1+

3645.88	2	3711.40	1 +	3756.46	1 +	3802.44	2
48.27	2	11.55	1 +	57.00	1	03.25	1 d
49.61	2	12.52	1	57.95	2	03.63	3
50.02	1	12.89	1	59.08	4	04.25	1
50.54	2	12.96	1	59.92	2	05.00	1 +
50.80	1	13.84	2	61.73	1	05.50	5
51.70	2	14.32	2	62.25	1	05.69	3
52.60	1	14.92	3	63.61	4	06.37	1
52.71	1 +	15.19	2	65.51	1	06.58	1 +
53.22	3	15.51	1	66.08	1	07.36	3
54.28	1	15.80	3	66.73	2	08.40	2
55.17	1	16.67	1	68.86	1	08.90	3
60.10	1	18.69	2	69.48	1	09.20	3
61.14	1	19.36	1	69.80	3	09.89	1
62.39	2	20.70	2	71.25	1 +	10.63	3
63.20	1	21.47	2	71.45	1 +	11.23	2
64.11	1	21.89	1	72.20	2	11.93	2
65.33	3	22.56	2	72.54	1	13.70	1
65.90	1	23.65	4	73.10	1 +	14.90	5
68.94	1	25.01	3	73.35	1 +	16.50	1
69.57	1 +	26.49	1	74.23	1	17.47	1
71.08	1	27.04	2	75.02	1	18.95	1
71.59	1	28.26	4	75.64	6	19.84	2
71.83	1	29.27	1 +	76.59	1	20.96	1
72.48	3	30.73	2	77.15	1	21.92	1 +
73.65	3	31.40	2 d	79.60	3	22.10	1 +
74.79	1 +	31.76	1	80.55	3	22.61	2
78.34	1	32.16	1	81.48	3	23.39	1
79.00	1 +	32.90	2	83.94	2	23.94	1
79.40	1 +	35.69	5	84.41	6	26.55	3
85.06	1	37.25	3	84.90	2 d	26.97	2 +
85.91	4	37.86	1	85.24	1	27.68	1 +
86.19	1 +	38.19	4	85.53	1	28.96	2
87.42	2	39.78	1	87.30	1	29.26	2
88.49	1	41.10	1	89.10	1	30.60	2
89.86	2	41.56	3	90.95	1	31.55	1
92.60	1 +	42.72	1	91.65	2	32.90	1
93.29	1	44.35	1 +	92.70	1 +	33.16	1
94.93	1	49.15	2 +	92.96	1	35.50	1
97.31	1	50.00	2 +	95.60	2	36.68	3
97.63	2	50.45	2 +	95.96	1	37.05	1
99.60	1 +	50.86	1	96.29	1 d	38.06	2
99.90	1 +	52.35	1	96.63	1	39.12	4
3700.60	1	52.62	3	98.06	1	39.63	2
01.08	1	52.80	3	99.40	1	42.05	3 +
02.98	1	53.47	1	3800.20	1 +	44.35	2
03.30	1	54.05	1	00.79	1	45.85	1
04.00	1	54.95	2	01.27	2	46.11	1
05.09	1	55.72	2	01.50	1	46.86	2

3847.09	1	3906.04	4	3956.09	2	3998.10	2
47.58	1	06.21	2 +	57.59	2	98.34	1
48.37	5	07.64	1 Sc?	58.14	4	98.85	2
48.63	5	07.98	4	59.25	1	99.54	1
50.38	2	09.39	1	60.39	1	4000.25	1
51.88	8	11.31	8	62.35	4	00.68	4
52.55	2	12.04	1 Sc?	63.29	6	01.45	1
53.65	1	12.37	3	64.04	3	02.48	1 +
54.76	2 d	13.82	2	64.33	1	03.32	1
58.70	3	15.26	2	67.20	2	04.15	4
59.85	1	16.06	2	67.89	2	04.40	2
61.10	2	17.76	2	69.01	3	04.99	1
62.70	3	18.15	1	69.83	2	06.50	1
63.52	10 r	19.05	1	71.84	1	07.58	3
64.27	1	20.02	3	72.35	1	08.38	1
64.70	1 +	21.10	5	72.55	1	08.90	2 Pr?
66.13	2	24.61	2	73.44	6	10.60	2
66.63	2	25.11	1	73.83	6	11.24	2
66.95	2	25.77	1	75.35	2	12.42	8
69.19	3	26.76	1	76.29	2	12.89	3
74.92	1	27.24	4	76.99	5	13.40	2 +
75.48	1	29.39	2	77.45	1	15.71	1
75.98	6	29.63	1 +	78.13	1	18.96	3
78.71	3	30.08	1	78.45	1	19.94	2
79.33	1	30.62	1	79.20	1	20.20	2
79.70	4	33.03	1	79.63	5	20.71	1
80.51	3	34.24	2	80.48	1	21.02	4
80.90	3	34.96	4	81.16	1	21.49	4
81.74	1	36.25	3	81.38	2	21.93	6
83.90	1	36.82	1	82.50	4	22.44	1
84.25	1	37.14	1	83.12	1	23.18	5
84.85	1	37.71	1	83.55	2	23.96	1
88.00	3	39.00	4	83.72	2	24.93	3
89.80	2	39.66	2	86.39	4	26.80	1
90.09	3	41.69	6	87.38	1	28.91	1
90.39	2	42.26	1	87.95	1	29.40	1
90.73	4	42.76	2	88.96	1	30.05	1
91.12	4	46.91	1	90.30	8	30.62	4
91.69	3	47.71	1 +	91.91	5	31.72	1 +
92.20	3	48.46	2	92.33	1	31.97	8
94.80	4	50.55	1	92.41	1	33.66	1
95.52	1	50.89	1	92.74	2	34.06	1
96.29	2	51.32	10 r	93.15	1	34.25	1
97.78	2	52.35	4	93.69	1	36.16	1
3900.40	5	53.00	3	94.23	1 +	36.67	1
02.01	5	53.62	5	94.35	1 +	37.52	1
02.58	1	54.54	1	94.86	8	37.78	1
03.67	1	55.21	1	95.40	2	38.27	2
05.32	1	55.71	1	97.58	1	39.69	1 + br

4040.54	1 +	4090.40	1	4136.39	1 +	4193.71
40.98	5	91.14	1	36.90	2	94.01
41.21	2	93.25	1	42.51	1	94.57
42.64	1	94.75	2	44.71	3	94.87
43.20	1	95.55	1	46.28	2	95.18
43.75	2	95.92	1	49.17	1 +	98.34
44.50	1	96.28	3	50.95	1	98.97
47.75	1	96.85	2	51.85	3	99.28
48.95	3	98.31	3	53.90	2 +	4200.20
49.64	1	99.06	2	55.96	1	03.60
51.30	5	99.31	1	56.30	10	04.50
53.40	1 +	4100.38	3	56.88	1	05.41
53.97	1 +	00.89	1 Pr?	57.73	1	05.78
54.54	1	01.61	1	59.72	2	07.00
55.01	2 Pr?	01.85	1	60.71	3	08.07
55.79	1	02.70	2	61.49	1 +	08.64
56.98	2 +	04.35	2	61.59	1 +	09.23
59.50	1	04.69	2	63.49	1	09.98
60.11	4	05.71	1	64.59	1	11.00
60.71	1	06.12	1	65.00	1	11.47
61.27	10	06.72	3	65.21	2	12.98
61.85	1	07.60	2 +	66.74	1	13.25
62.36	1	08.10	2	67.68	1	13.38
66.70	1	09.21	5	68.16	2	14.40
67.85	1	09.60	8	68.92	1	14.74
69.00	2	10.61	4	70.65	2	15.53
69.40	4	11.54	1	70.92	2	17.22
71.62	1	12.70	1	73.54	2	17.44
74.55	2	13.98	3	74.33	1	18.7
74.90	1	15.30	1	74.66	1	19.70
75.25	5	16.48	1	75.75	4	20.4
75.43	4	16.92	4	77.50	8	21.30
77.30	1	19.47	1	78.61	2	21.8
77.75	3	20.81	2	78.76	3	22.2
78.41	1	22.10	2	79.72	3	23.3
80.37	3	23.12	1 d	81.03	1 +	25.00
82.58	2 +	24.04	4	82.45	1	25.7
83.39	1	25.21	1	82.67	2	27.1
83.70	1	25.68	1	83.30	1	27.8
84.03	1	28.29	1	83.84	1	28.1
84.40	1	28.85	1	84.30	1	28.3
84.68	1	29.22	1	85.14	2	28.6
85.30	1	30.02	1	85.90	1	28.9
85.94	3	30.91	1	86.18	2	29.6
86.95	1	32.72	2	88.40	2 +	31.3
87.59	1	33.52	5	88.96	1	32.5
88.67	2	34.89	1	90.30	1	33.3
89.23	1	35.48	8	90.61	1	34.3
89.78	2	35.98	1 +	92.64	1 +	35.4

4237.45	1	4374.55	1	4299.84	2	4324.30	1
37.93	1	74.92	1 +	4300.06	1	25.05	1 +
40.01	4	75.25	5	01.04	2	25.36	1
40.39	1	75.64	1	01.40	2	25.87	15
41.37	2	75.90	2	01.60	1	26.50	1
43.27	1	76.45	1	02.03	1	27.07	1
43.36	1	77.42	3	03.44	1	27.25	1
44.47	1	78.16	1	03.78	20	28.06	5
44.72	1	78.26	1	04.63	4	28.30	2
45.14	1	78.62	1	05.60	2	28.85	1
45.83	1	78.91	1	06.44	1	29.55	1
47.05	2 Sc?	79.47	1 +	06.91	2	29.78	1
47.54	10	79.61	1	07.35	1	30.24	1
48.30	1	79.83	1	07.75	1 +	30.43	1
49.49	1	80.33	2	07.88	3	30.59	1
50.53	2	80.55	2	09.10	1 +	30.81	1
51.55	1	80.90	1	09.70	2	31.03	1
52.18	1	81.12	2	09.94	1	31.23	1
52.60	4	81.53	1	10.25	1	31.53	1 +
53.02	2 +	81.99	1 +	10.65	2	31.75	1
53.25	1 +	82.67	10	11.40	2	31.95	1
54.03	2	83.20	1	12.25	1	32.40	1 +
54.45	2	83.55	1	13.52	2	32.65	1
56.01	2	84.15	1	13.74	1	32.72	1
56.39	2	84.66	5	14.54	3	33.35	1 +
56.60	2	85.00	1 +	14.67	4	33.55	1
56.96	2	85.40	1	14.87	1	34.1	1 + br
57.44	1	86.10	1	15.45	1	34.70	1
57.93	2	87.53	2	16.24	1	34.94	1 +
58.25	1	88.15	1 +	16.63	1	35.34	1
59.10	1	88.45	1 +	17.33	2 +	35.52	1
59.76	2	89.45	1	17.87	1	35.80	1 +
62.00	3	89.55	1	18.16	1 +	36.1	1 + br
62.42	2	90.54	2	18.55	1	37.00	1
63.59	2	91.09	3	18.78	1	38.23	1 +
64.10	3	91.35	1	19.48	1	38.85	5
65.34	1	91.85	1	19.71	1	39.07	2
66.02	1	92.05	1	20.11	1	40.10	1
66.58	1	93.05	1	20.47	1	40.43	1
66.86	3	93.36	1	20.92	1	40.86	1
67.55	1	94.67	1	21.35	1	41.50	1 +
68.40	1	94.88	1	21.57	1	41.95	1
68.90	1	95.38	2	21.97	2	42.23	3
70.07	1	96.00	1 +	22.24	1	43.65	2
70.72	3	96.50	1	22.69	1	43.90	2
72.95	4	96.92	1	23.04	1	44.15	1
73.89	2	97.51	2	23.41	1	44.50	1
74.15	1	97.93	3	23.69	1	45.08	1
74.25	1	98.63	2 +	24.05	2	45.65	1

4345.75	1	4367.60	1 +	4393.53	1	4419.70	1 +
46.23	1	68.78	5	94.36	2	20.30	1 + d
46.64	1 +	69.59	1	94.83	1	20.69	2
47.04	1	70.26	2	95.13	1	20.95	1
47.35	1	70.45	2	95.66	2	22.03	1 +
48.50	1	70.90	1	96.06	2	22.15	1 +
48.69	2	71.20	2	96.2	1 + br	23.20	1 +
49.22	2	71.53	1	97.05	1 +	23.40	1 +
49.81	1	71.75	1	97.45	1 + d	24.78	1 +
50.38	2	72.30	2	97.84	2	26.26	2
50.60	1	72.44	2	98.20	2	26.63	1
51.41	8	72.88	2	98.39	1	26.99	2
52.03	1	73.30	1	98.85	1	28.03	1
52.26	1	73.80	1	99.18	1	28.30	1
52.65	1	74.24	1 +	99.75	2	29.13	1 +
53.16	1	75.11	10	4400.25	1	29.45	1 +
53.42	1	75.59	1	00.96	10	30.35	1
53.77	1	75.85	1	01.20	1	30.58	1
54.16	1	76.57	2	02.65	1	30.75	1
54.45	1 +	77.24	2	03.13	1	31.07	1 +
55.05	1	77.52	2	03.30	1	31.19	1 +
55.51	2	78.20	1	03.50	1	31.88	1
55.63	1	78.95	1	03.70	1	32.03	1
56.14	4	79.26	1	03.86	1	32.44	2
56.88	1	79.95	1 +	04.15	1	35.20	2
57.07	1	80.50	1	04.33	1	36.80	1
57.39	1	81.30	1	05.45	1	37.28	1 +
57.75	1	81.47	2	06.05	2	37.53	1 +
58.38	8	81.85	1	06.68	1 +	37.90	1
58.89	2	82.06	1	07.22	3	38.38	1 +
59.09	1	82.91	3	07.45	1 +	39.11	3
59.41	2	83.13	1	08.10	1	39.35	1
60.03	1 +	84.05	1	08.27	1	39.53	1
60.75	1	84.39	1	08.99	3 (Pr)	40.07	2
60.99	2	84.70	2	09.68	2	40.37	1 +
61.55	2	95.28	1	10.41	2	41.00	1 +
61.70	1 +	85.81	10	10.88	1	41.50	1 +
62.04	2	86.03	1	11.20	8	41.73	1
62.87	1	86.70	1 +	11.45	1 +	43.53	2
63.17	1	87.47	1	12.41	3	43.76	1 +
63.40	1	88.37	1	13.49	1	44.34	1
63.63	1	89.06	1	13.93	1	44.44	2
63.94	1	89.67	1	14.58	2	44.65	1
64.28	3	90.17	2	14.98	1	44.90	1 +
65.09	2	90.83	3	16.14	1	45.11	2
65.36	2	91.29	2	16.71	1	45.40	1 +
66.52	5	91.75	1	17.02	2	46.51	10
67.10	1	92.10	1 +	18.21	2	46.83	1
67.30	1	92.28	2	18.58	1	48.10	2

4449.01	1	4476.00	1	4505.00	1	4533.97	1+
49.93	1+	77.40	1+	05.43	1	34.90	1
50.26	1	77.59	2	05.92	1	35.18	1
51.25	1	78.03	2	06.25	1	35.45	1+
51.71	10	78.68	2	06.73	4	35.77	1
52.16	3	79.51	1	06.97	1	36.10	1
52.35	1	81.13	3	07.60	1+	37.72	1
53.80	1+	82.08	2	08.15	1	37.87	1
55.30	1	83.32	1	08.45	1	38.55	1
55.79	2	83.53	1	09.55	1	39.42	1
56.05	1	83.88	1	09.99	1	40.07	1
56.30	1	84.40	2	10.27	1+	40.62	1
56.54	3	84.66	1+	10.97	1	41.42	5
56.75	1	85.15	2	11.45	1	41.65	1
57.05	1	86.13	2	12.00	1+	42.23	2
57.33	1	86.74	1	12.10	1+	42.77	4
57.75	1	87.15	1	12.46	1	42.99	1
59.09	1	87.81	2	12.66	1	43.77	1
59.53	1	88.49	1	13.48	4	44.41	2
60.10	1	88.83	1	14.65	1+	45.48	2
60.31	2	89.32	1	15.03	1	46.65	1
60.97	1	90.95	2	15.55	1	48.40	2
62.56	3	91.36	1	16.30	1+	49.16	2
63.09	10	91.79	2	16.52	3	52.38	1
63.30	2+	92.25	1	16.80	2	53.68	1+
64.30	1+	92.64	2	17.08	1+	53.90	1+
64.39	1+	93.58	3	17.41	1+	54.30	1+
65.21	3	94.10	1	17.90	1+	54.79	1
65.75	3	95.83	1	18.54	1+	55.13	2
66.01	2	96.70	1+	18.75	1+	55.31	2
66.23	1	97.43	3	20.45	1	56.30	3
66.44	1	98.05	3	21.45	1+	56.90	3
68.00	3	98.40	1	22.29	1+	57.12	1
68.24	1+	98.66	1	23.04	3	57.56	2
68.52	1+	98.90	1	23.76	2	57.94	1
68.85	1+	99.05	1	24.2	1+ br	58.88	1+
69.25	2	99.34	1	24.76	1	59.35	1
69.42	3	99.42	1	25.90	1	59.70	1
70.65	1+	99.75	1	26.28	1	59.85	2
70.75	1+	4500.38	1	26.56	2	60.60	2
71.14	2	00.55	1	27.42	2	61.20	1+
71.56	2	01.06	1	28.40	1	61.36	2
71.77	1	01.41	1	29.36	1+	62.01	2
72.50	1	01.65	1	30.14	2	62.53	1
73.65	1	01.98	8	30.51	2	63.37	5
74.00	1	02.20	1	31.18	1	63.62	1+
74.48	1	02.60	1	32.47	1	64.17	1+
74.90	1	03.34	1	33.05	1+	64.40	1+
75.75	2	03.47	1	33.55	1+	64.74	1

4565·00	1 +	4591·90	1	4633·52	1	4666·33	1 +
65·15	1	92·33	1 +	34·35	5	69·34	2
65·35	1	94·00	1 +	34·58	1 +	69·85	1
65·86	1	94·16	1 +	35·13	1	70·18	1
66·23	1	94·61	3	35·55	1	70·50	1 +
67·54	1	94·91	2 d	36·40	1	70·75	3
67·79	3	97·16	4	36·70	1	71·28	2
68·24	1 +	97·40	1 +	37·34	2	72·70	2 +
69·00	1 +	97·70	1 +	38·82	3	73·68	1
69·45	1	98·55	1	39·25	2	74·15	1
69·89	1	99·51	1	39·50	2	74·38	1
70·05	1	4600·66	1	39·74	1	74·70	1
70·60	1	02·38	2	40·35	1	75·71	1
71·06	1	03·96	3	41·23	3	75·91	1
71·23	1	04·59	1	42·50	2 d	76·45	1
71·90	1	05·98	1	44·98	1	77·30	1
72·28	1 +	06·55	1	45·15	1	77·60	1 +
72·85	1 +	06·95	1	45·92	4	78·38	1 +
73·16	1	07·24	1 +	46·55	2	79·10	1
74·06	1	09·38	2 d	46·85	1 +	79·45	1 +
74·20	1	09·75	1	47·95	1	80·92	3
76·00	1	10·00	2	48·13	1	81·45	1
76·64	1	10·38	1	48·87	1	82·30	1
78·40	1	10·70	1	49·83	3	83·66	4
79·01	5	12·62	2	50·40	2	84·22	3
79·47	5	14·02	1	51·20	1	85·06	1
79·70	1 +	15·59	1	51·38	1	85·53	1
80·85	1	15·85	1	51·78	1	87·23	1
81·10	1	16·10	1	52·56	2	88·02	1 +
81·40	1	16·25	1	53·47	1	88·72	1
82·75	1 + br	16·87	2	54·32	1 +	89·19	1
83·35	1	18·22	2	54·49	1	89·65	1
83·81	1	21·00	1	54·88	3	90·55	3
84·21	2	21·39	1	57·39	1	92·50	1
85·01	1	21·74	1	57·76	1	93·17	1
85·24	1	22·10	3	58·03	1	93·83	1
85·60	1 +	22·35	1	58·36	1	94·55	1 +
86·02	1	22·60	1	59·30	1	95·00	1 +
86·21	1	23·21	1	59·55	1	96·63	3
86·40	1	23·99	1	59·65	1 +	97·17	1
86·77	3	24·39	3	60·46	1	97·45	1
87·13	2	26·63	2	60·66	1	98·49	1
87·90	1	28·11	3	61·51	1 +	99·55	1
88·24	1	28·60	1	63·15	2	4700·05	1 +
89·14	1 +	29·40	1	64·18	1	02·19	1 +
90·68	1	30·06	2	64·62	3	02·66	1 +
91·09	1	31·45	2	65·43	1 +	03·25	1 +
91·27	1	31·75	1	65·70	1 + d	03·75	3
91·55	1	32·81	2	66·12	1 +	04·02	2

4706.72	8	4755.15	1 +	4797.06	1	4853.52	3
07.15	2	56.06	2	97.33	3	54.90	2 +
07.75	1	57.75	1	98.21	2	55.47	2 +
08.23	1	58.10	1 +	99.60	3	59.18	5
08.55	1	58.74	1	4802.06	1 +	59.73	1
08.70	1	58.85	1	03.94	1	61.95	1
09.90	5	59.32	2	04.61	1	62.4	1 + br
10.80	1	59.55	1	04.97	1 +	63.73	1
11.13	1	60.66	1	05.29	2	64.36	1
12.05	1	61.75	1	05.66	1	64.96	1
12.14	1	61.96	1	06.35	1	65.45	1
13.25	1	62.63	1	06.80	2	66.90	3
14.41	1	63.51	1	09.26	1	68.00	2
15.75	5	63.81	2	09.63	1 +	69.45	2
17.25	3	64.04	3	10.69	1	73.90	1
19.20	3	64.75	1	10.95	1	74.56	1
20.45	1 +	66.61	1	11.50	5	76.00	2
21.10	1	67.70	1 +	12.85	1	76.25	2
21.44	1	67.85	1	17.31	3	79.97	2
21.87	1	69.50	2	18.70	1 +	80.68	1
24.51	5	70.05	1 +	19.11	2	81.91	1
25.06	1	70.39	2	19.80	2 +	83.06	2
26.55	1	71.25	1	20.49	4	83.99	4
26.74	1	71.77	1 +	21.55	1 +	85.16	1
28.60	1	71.90	1	24.35	1	87.49	1
29.56	1	72.45	1	25.67	8	89.26	4
30.63	1	73.07	3	26.73	1	90.55	1
31.98	3	74.10	1	27.80	1 +	90.86	4
34.10	2	74.37	1 +	27.95	1	91.25	3
35.10	2	75.50	1 +	28.76	2	93.39	2
36.36	2	76.27	1 +	31.00	1 +	94.46	1
38.4	1 + br	77.20	1 +	31.27	1 +	97.09	3
40.1	1 + br, d	77.87	3	32.47	4	99.47	1
42.56	1	78.55	1	33.66	1	4901.72	2
43.50	1 +	79.13	1	34.63	1 +	02.00	3
43.85	1 +	79.61	3	35.50	1 +	02.20	2
44.50	1 + br, d	80.70	1	35.84	1	07.44	1
45.10	1 +	81.16	1	36.16	3	07.96	1
45.55	1	81.65	1	36.80	2	09.53	1 +
48.27	1	83.99	3	43.00	1 +	10.23	2
48.62	1	86.24	3	44.3	1 + br	13.59	3
49.17	1	87.59	2	45.00	1 +	14.52	4
49.28	1	88.18	1 +	45.50	1 +	16.30	1 +
49.71	2	88.50	1 +	46.06	1 +	17.53	1
49.93	2	89.60	4	46.50	1 +	20.84	10
50.20	1	90.47	1 +	47.30	1 +	21.28	1 +
52.70	1	92.80	1	47.73	1 +	22.62	1
53.4	1 + br	94.30	1	49.19	4	24.69	4
54.67	1 +	95.1	1 + br	50.28	1 +	26.87	1 +

4928.0	1 + br	5057.03	1	5221.71	1	5384.05	1 +
29.0	1 + br	63.86	2	25.19	2	86.07	3
30.89	1	66.96	1	28.55	2	87.30	1 +
32.69	1	72.01	1	34.31	4	88.43	1 +
43.10	2	74.01	1 +	39.90	3	93.90	1 +
44.05	2	74.66	1 +	49.70	8	96.90	1
44.97	3	75.79	1 +	50.93	3	99.27	1
47.15	2	76.71	3	55.64	4	5400.35	1
49.15	1	77.30	1	57.55	1 +	03.10	1 +
50.44	1 +	79.23	1	64.35	1 +	06.35	1
50.85	1 +	89.99	3	69.65	1	07.88	1 +
52.64	1	92.95	4	69.95	1	12.13	1 +
54.91	2	96.67	1	70.26	1	14.95	1
55.30	1 +	5102.55	3	70.86	1	16.51	3
55.80	1 +	03.80	1 +	72.18	1 +	17.70	1 +
58.29	1	05.40	2	73.56	5	20.80	1 +
59.28	4	06.79	2	76.99	3	21.71	3
61.54	3	07.74	4	86.83	1	29.48	1 +
63.46	2	19.76	1	87.30	1	30.98	2
65.95	1	21.48	1	91.84	1 +	31.70	4
66.85	1 +	23.92	4	93.35	10	32.54	1
69.90	1	30.75	5	5302.44	3	39.00	1 +
71.05	2	32.49	3	03.35	1	41.43	2
72.85	1 +	37.00	1	06.61	2	42.43	4
73.00	1	43.49	1	08.60	1 +	44.05	1 +
73.57	1 +	49.70	1	10.19	1 +	47.72	2
75.64	2	51.98	1	11.62	3	49.39	2
81.05	1 +	53.25	1	14.73	1 +	50.00	1 +
81.44	2	53.58	1 +	16.75	1	51.28	4
83.06	1	56.18	1	19.28	1 +	55.95	4
87.30	3	61.85	1	19.98	10	56.68	1 +
89.60	2 +	65.28	3	29.30	1 +	57.82	1 +
90.09	4	68.05	2	34.50	1 +	58.35	1 +
96.80	1	71.08	1 +	36.66	2	58.75	1
98.67	2	76.93	2	38.10	1	61.57	1
5000.55	2	79.91	4	45.82	2	69.93	1 +
11.82	1	81.34	2	49.4	1 + br	70.55	1 + br
14.69	1	82.78	2	49.75	1 +	73.25	3
15.58	1	91.62	5	50.50	1 +	74.89	3
27.30	1	92.80	6	57.11	4	75.60	1 +
28.00	2	95.75	1 +	61.40	1 +	78.85	2 + br, d
29.60	1	98.24	1 +	61.66	5	83.30	1 +
32.86	1	5200.29	3	65.29	1	84.20	1 +
33.66	2	04.60	1 +	70.35	1 +	85.22	3 +
34.91	1	11.95	1 +	72.10	4	85.86	8
40.34	1	12.53	3	77.15	1 +	87.20	1
43.65	1	13.40	1	77.94	1 +	91.57	1 +
51.24	1	15.80	1	78.38	1 +	92.50	1
51.80	1	19.7	1 + br	80.20	1 +	93.55	1

5494.20	4	5587.76	1	5699.10	1	5788.35	2
96.60	1	88.11	1	5702.40	3	95.33	2
99.06	1	89.09	2	06.36	3	5800.24	2
5501.69	1	92.80	1	07.53	1+	04.17	5
03.90	1+	94.58	10	08.42	4	09.41	2
05.16	1+	95.98	1	10.53	1+	11.72	3
07.84	1	5601.61	1	13.20	1	14.05	2
08.58	2	02.06	1	14.10	1+ br	15.59	1
09.30	1	02.81	2	18.30	3	18.94	1
12.85	1+	03.80	2	19.26	2	20.54	1
16.45	1	05.1	1+	24.10	1+	23.53	2
18.89	1+	05.8	1+	26.47	1+	24.1	1+ br
19.60	1+	08.63	1+	27.02	3	26.02	3
20.20	1+	11.35	1	28.09	1+	26.91	2
20.81	1+	14.44	2	29.49	4	30.90	1
20.94	1+	15.50	1+	30.55	1	37.29	1
22.36	1	17.03	1+	31.32	1	39.23	1+
24.10	1+	17.84	2	32.01	1	42.52	3
25.90	2	19.15	1	34.45	1+	43.35	1
28.51	2	20.75	10	34.73	2	44.85	1+
29.21	1+	22.50	1+	39.05	1	46.10	1
32.26	1	23.76	1	40.15	2	46.53	1
33.57	1	25.52	1+	41.04	3	47.81	1+
33.99	4	25.88	2	41.45	1	53.66	1+
35.48	2	31.65	1+	42.28	3	54.10	1+
36.55	1+ br	35.91	1	42.93	1+	54.60	1+
37.95	1	39.20	1+	43.36	2	56.59	1+
39.00	1+	39.70	1	44.30	1	56.88	1+
39.36	1+	43.43	1	44.92	3	59.10	3
40.95	1	44.3	1+ br	47.04	1	59.85	1
42.53	1	48.20	1	48.30	1	60.44	1
43.39	2	51.45	1	49.22	1	61.35	1+
46.05	2	52.19	1	49.32	2	62.48	1
46.25	1+	53.79	1	49.81	1	62.67	1
48.61	3	59.94	1	53.71	2	63.54	1
48.85	2	62.59	1	53.95	1+	63.75	1
50.29	2	65.9	1+	55.39	1+	65.23	3
53.07	1+	66.75	1+	60.16	1	67.24	3
55.99	1+	69.02	3	61.86	2	69.07	3
57.62	2	69.48	1+	62.20	1	69.81	1
59.24	1+	69.94	1	62.53	1+	71.19	2
61.37	2	75.98	1+	64.36	1	73.55	1
70.11	2	76.12	2	67.50	1+ br	74.60	1
75.65	1	76.48	1	70.04	2	76.48	1
76.84	1	77.99	1+	70.65	2	77.97	2
77.85	1+	88.67	5	72.33	1	78.33	1+
78.0	1+ br	89.65	1	76.26	2	80.50	1
78.79	1	90.43	1+	83.80	1+	81.48	1
81.75	2	97.4	1+ br, d	85.09	2	82.99	2

5883.49	3	5982.24	1	6065.40	1+	6136.09	1	
86.40	1	84.55	1+	66.25	4	41.47	1+d	
88.06	3	84.90	1+	67.16	1+	42.60	1	
90.66	2	88.30	2	67.30	1+	44.68	1+	
91.70	3	89.48	3	68.94	1	48.71	1	
92.85	1+	90.40	1	69.90	1	49.41	3	
99.05	1	90.86	1	71.90	4	50.45	1	
99.66	1	94.19	1	73.31	1	52.94	1	
5900.64	2	94.94	3	74.19	4	55.22	3	
02.32	1	96.65	3	74.67	2+	56.35	2	
06.83	3	97.15	1+	77.40	2	56.75	2	
10.07	3	6000.25	1	77.66	1	57.08	1+	
10.45	1	02.50	1	80.81	1	58.01	3	
14.60	2	02.74	1	81.76	1	59.45	1+	
14.88	1	04.16	1	82.25	1	61.42	2	
17.63	1+	04.52	1	84.79	2	61.71	3	
21.43	2	06.55	1	87.14	2	62.39	3 (Ca)	
22.96	2	07.81	4	87.70	1	62.52	1	
29.13	1+	09.46	2	88.10	1	64.60	1	
31.65	1	11.05	1	91.48	1+	65.84	1	
32.31	1+	11.70	1	91.80	1	66.13	1	
32.65	1+	15.45	1	92.25	1	66.84	3	
34.96	2	17.88	1	97.99	1	68.25	1	
35.7	1+	br	20.40	1	98.39	1	69.30	1+
39.95	1+	20.65	1+	99.13	1+	70.68	4	
41.30	1+	22.20	1+	99.40	1+	70.96	1	
43.40	3	22.80	1	6101.41	2	72.74	1	
47.58	1	23.51	1	02.93	1+	74.46	1	
48.83	1+	23.75	1	04.28	1	76.25	1	
49.83	2	25.70	1	04.60	1	78.35	1	
50.70	1+	31.49	3	05.70	1	78.72	5	
53.27	1	33.47	3	06.95	1+	80.95	1+	
56.06	2	34.41	3	07.95	1+	81.80	1+	
61.32	2	35.75	1	08.59	3	83.23	1	
62.63	1+	38.66	1	09.22	1	84.09	3	
63.45	1	41.20	1	09.84	2	84.40	1	
66.56	1	43.93	1	12.20	1+	87.15	1	
66.90	1	50.01	1+	13.65	2	89.64	1	
67.11	1	50.70	1+	14.60	1	91.85	1+	
68.45	1	52.09	2	17.38	1+	92.50	1+	
72.69	1	53.99	1	22.39	3	95.27	1+	
74.45	1	54.67	1	23.16	1	96.02	1+	
74.75	1	56.45	1	26.50	1+	96.38	1+	
75.64	1	57.20	1	29.35	1	98.77	1	
76.50	1	57.55	1	30.75	1	6201.91	3	
77.65	1	57.81	1	31.96	1	06.27	1+	
78.11	1	58.52	1	33.70	2	08.18	2	
78.97	1	59.01	1+	34.15	1	08.40	3	
80.14	1	61.24	1	35.43	1	10.84	1	

6212.95	1	6302.50	1 +	6425.05	1	6510.20	1 +
16.81	2	05.45	1	25.98	3	15.20	3
18.30	1	06.00	1	27.26	1 +	20.11	2
20.19	1	07.24	1	28.83	4	20.48	1 +
21.30	1 +	08.46	1	30.06	1	21.22	1 +
22.30	1	10.69	10	31.39	1 +	23.39	2
23.57	5	12.95	2 +	31.92	1	40.13	2
26.68	3	13.44	1	32.82	2	41.3	1 + br
27.36	1	17.90	1	33.40	2	44.0	1 + br
28.09	1	19.88	3	33.71	1	49.71	2
30.20	1	21.33	1 +	35.13	1	50.41	2
30.49	1	22.26	1 +	36.20	1 +	51.90	1 +
38.68	3	27.15	1 +	40.05	1 +	53.23	1
43.50	1	28.63	2 +	45.95	2	59.19	1
44.23	4	30.38	3	47.68	1 +	64.13	1
48.42	3	32.10	1 +	49.00	1 +	64.45	1 +
50.62	2	39.05	1	50.88	1 +	68.70	1
52.00	2	41.69	10	51.40	2	69.85	1
57.70	2	46.52	1 +	55.01	1	72.15	1 + br
58.92	4	46.72	1 +	55.25	1 +	72.87	1
60.9	1 + br	48.03	1 +	57.33	2	76.10	1 +
63.40	2	52.16	2	58.13	1 +	79.80	1 +
64.55	1	54.95	1	61.38	1 +	80.94	1
68.80	1	56.10	1 +	63.76	2	81.19	2
69.66	1	56.74	1	65.20	1 +	84.76	1
70.52	2	58.60	1	65.44	2	85.90	2
71.76	1 +	61.09	1	70.95	1 +	88.23	1
71.97	1	61.65	4	71.85	1	89.25	1
73.00	1	62.28	4	73.80	1 +	91.18	1
77.50	3	65.18	1	74.46	1	95.24	1
78.41	1	65.72	3	76.40	1	6602.00	1
79.15	1 +	66.95	1 +	78.98	1 +	04.62	1 +
79.60	1 +	72.99	1	80.06	1	09.90	1 +
79.90	1 +	76.16	3	80.45	2	12.24	1 +
82.20	2	77.46	1	81.85	1	16.15	1
82.65	1 + d	78.80	1 +	82.50	2	18.75	1 + br
85.99	3	82.29	5	83.65	1	19.55	1
86.25	1	84.85	1	84.59	1	24.4	1 + br
87.41	2	85.32	15	85.90	5	25.6	1 + br
87.75	1	90.19	4	87.70	1	30.35	3
90.08	1	91.70	1 +	89.41	1	37.42	2
92.20	1	95.13	1 +	92.57	2	38.19	3
93.03	3	97.08	1 +	95.80	1	50.79	3
93.80	1	6403.42	2 +	97.58	1	55.90	1 +
97.28	3	04.17	1	6500.37	2	67.75	1 +
98.60	3	07.03	1	02.10	1	69.85	1 +
6301.16	1	08.65	1 +	04.68	2	78.70	1 +
02.00	1 +	14.24	1 +	05.10	1 +	80.39	1
02.16	1 +	14.51	1 +	07.48	1 +	6738.02	1 + br

6740·35	1	6790·70	1 +	6804·27	1 +	6847·00	1 + br
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XLIV. Nh. Neoholmium.

Ältere Messungen: G. Eberhard, Publ. d. Astroph. Obs. Potsdam, 20 (1909). J. M. Eder und E. Valenta, Wiener Ber. 119 II a (1910) (Rot).

Material: Neoholmiumnitrat von C. Auer von Welsbach, auf Gaskohle.

Verunreinigungen: Ad, Y.

Linienzahl: 1482.

2713·75	1	2862·83	1	2955·09	1	3020·63	2
34·04	2	66·86	1	55·39	1	22·28	1
50·46	2	72·10	2	59·05	1	23·25	1
59·45	1	72·55	1	61·16	1	24·50	1 d
66·97	1	73·99	1	61·59	1	26·25	1
69·99	2	74·19	2	64·62	2	28·30	1
72·91	1	74·55	2	68·89	1	31·24	1
73·98	1 +	80·38	3	70·66	1	31·39	1
77·20	1	81·10	3	72·55	1	33·55	1
94·00	1 +	82·15	1	73·12	3	35·76	2
94·51	1	84·77	1	75·36	1	36·32	1
2800·07	1	91·51	2	75·80	1	38·40	1
06·82	1	95·10	3	76·44	1	38·81	2
09·20	1	95·74	2	78·19	1	44·50	1
10·10	1	97·68	1	79·75	3	47·55	1
11·46	2	2900·95	2	80·76	1	49·50	3
12·10	2	02·30	1	81·58	2	50·84	2
14·52	1	04·60	2	84·19	1	52·46	1 +
14·85	2	09·53	4	84·35	1	54·11	3
15·00	1	10·49	2	85·60	2	54·98	2
19·90	1	15·95	2	87·76	3	56·65	1
23·47	1 +	19·75	2	88·03	1	60·36	1
23·75	1 +	21·96	1 +	90·38	2	60·97	1
24·30	3	26·20	1	92·80	1	62·65	2 d
26·74	1	27·10	1 +	95·98	1	63·26	1
31·80	2	28·42	2	98·40	1	64·10	1 +
35·10	2	36·35	1	3000·81	1 +	64·31	2
35·96	1 +	41·10	1	02·50	2	66·34	1
43·53	1 +	42·15	2	02·75	1	67·55	1 +
44·29	1	42·70	1	03·95	1 +	70·87	1
44·80	1	44·61	2	05·41	1 +	72·62	1
49·21	2	45·94	1	07·20	1	73·07	1 +
53·01	1 +	47·29	1 +	09·60	2	73·43	2
59·97	1	52·48	1	12·19	1	73·80	1
60·98	1	52·85	1	14·71	2	74·42	2
61·34	1	53·23	3	17·85	1	75·30	1 +
61·60	2	54·40	1	18·27	1	75·65	2

3078.45	1	3144.49	4	3183.98	3	3230.14	1 +
78.51	1	45.75	1 +	84.50	2 +	30.70	3
79.01	1	46.27	2	84.66	2 +	31.05	1
80.90	1 +	47.09	1 +	85.37	1	31.77	1
83.56	2	47.70	1	85.63	1	32.16	1
84.11	1	48.98	2	87.54	2	33.49	3
84.48	4	50.09	2	88.74	1	34.00	1 +
85.86	1	51.16	1	90.05	1	34.65	1
86.66	4	52.50	1	90.84	1	35.75	1 +
89.92	1 +	53.18	1 + d	91.15	2	36.00	1
94.59	1	53.60	1	91.47	1 +	36.70	1
95.47	1	53.83	1 +	92.60	1 +	37.05	2
95.99	1	53.91	1	93.40	1	37.54	2
97.55	2 +	54.41	1	94.59	1	38.10	1
99.31	1	56.31	3	95.24	2	38.28	1
3102.01	1	56.65	2	96.08	1	38.84	1
02.82	2	57.09	3	96.20	1	39.17	1
05.31	2	57.48	2	96.65	1	40.55	2
06.20	1 +	58.53	2	97.09	2	41.60	1 +
06.96	1 +	59.80	3	97.44	1	42.11	1
07.05	1 +	60.27	1 +	97.96	3	43.13	1 +
08.45	3	60.60	2 +	99.80	1 +	43.40	1 +
08.78	2	61.64	1 +	3201.13	1	45.25	1
10.05	3 d	62.96	1	01.90	3	46.79	1
11.98	1	64.22	2	02.67	1	47.35	1
13.68	2	65.83	2	04.41	2	49.46	1
14.50	1	66.45	1	04.89	1 +	50.34	1
14.73	1	66.75	5	05.97	1 +	51.40	2
14.80	1	67.25	1	06.30	1	51.80	1
17.10	1	67.53	1	06.99	3	52.30	1
18.63	4	68.01	2	07.86	1	56.43	2
22.79	2	68.65	1	08.15	1	57.53	3 d?
24.51	1	68.90	1	08.78	1	58.18	1
25.80	1	69.84	2	10.52	3	58.57	2
28.55	1 +	70.15	1	11.98	2 +	59.24	2
29.34	1	71.84	5	12.80	1	59.38	1 +
30.90	2 +	72.50	2	13.39	1	62.34	2
31.12	3	72.98	1	14.53	1	62.99	1
31.37	1	73.19	1	15.48	2	63.14	1
32.66	1	73.92	3	20.20	1	63.79	2
32.90	1	74.06	2	20.48	1	64.91	3
34.53	3 d	74.99	3	20.85	2	65.70	1 +
35.01	1	75.64	1	21.00	2	66.48	2
37.97	1 +	76.77	1	21.56	2 +	67.26	1
40.26	1	77.09	3	23.42	2	67.50	2
40.79	1	80.00	1	24.40	1	68.85	1 +
41.26	2	81.65	4	25.40	1 +	69.25	1
42.70	1 +	82.05	2	27.29	1	69.55	1
42.96	1	83.56	2	29.25	1 +	69.79	1 +

3271·10	1	3321·25	2	3374·50	1 +	3420·89	1
71·50	1 +	22·77	1	75·24	1	21·78	10
72·25	1	23·07	1	80·64	1	24·14	1
75·30	1	23·34	2	80·78	2 +	24·25	1
75·60	1	23·89	2	81·25	1	25·49	20
76·38	2	29·16	2 +	81·48	1 Er	26·90	3
77·29	2	29·80	1 +	85·19	5	28·27	20
78·29	5	31·15	1 +	86·55	1	29·33	5
79·40	4	32·05	2	88·55	1 +	32·23	3
80·27	1	32·51	1	89·00	1	34·51	2
80·36	2	33·30	2	89·70	2	34·90	2
80·89	1	34·0	1 + br	89·89	1	35·75	2
81·32	2	35·21	2 +	90·89	3	36·43	2
82·12	6	36·47	1 +	92·19	3	37·17	2
82·93	1	37·34	6	92·53	1 +	38·05	2
83·22	2	37·93	1	93·15	1	38·47	1 +
84·25	1	38·90	6	93·74	3	41·57	1
86·31	1	40·15	2	94·77	4	42·80	1
88·60	3	40·55	2 +	96·29	2	45·70	3
89·52	5	41·13	1	97·00	1	47·12	1
91·10	4 d	42·83	2	97·45	1	49·14	1 +
91·40	1	43·70	10	98·41	1	49·47	2
93·97	1	44·60	2	99·12	20	50·01	1 +
94·84	1	44·90	1 +	3400·74	1	51·35	1
95·95	1 +	46·17	2	01·75	2	51·86	1
97·19	2	48·71	2 +	01·93	1 +	53·28	15
98·26	2	50·60	3	02·33	1	54·00	1 +
99·56	1 +	52·22	3	03·40	1 +	54·45	2
3301·48	1	53·60	3	03·9	1 + br	55·85	3 +
02·51	1	53·71	3	04·05	1 +	56·15	30
04·06	1	54·71	3	05·25	1	56·68	1 +
04·53	1	56·13	1	06·41	2	56·9	1 + br
04·90	1	57·12	2	07·32	1	58·03	1 +
05·30	3	58·04	3	07·97	3	58·59	1
05·70	1	59·65	1 +	08·35	3	59·6	1 + br
07·00	1	61·01	2	09·20	3	61·10	3
09·00	2	61·36	2	10·39	10	61·50	2
10·30	1	62·76	1	10·79	5	62·11	10
12·55	3 v	63·55	2	11·70	3	62·70	1
12·85	1 +	64·24	2	13·02	1	64·01	1
14·15	1 + br	64·41	2	13·93	2	64·51	2
15·80	2	68·19	2	14·37	1	64·65	1
16·50	2	69·91	1	14·49	2	67·22	4
17·61	1	70·67	1	15·06	15	68·58	1
18·33	1 +	71·00	3	16·60	15	69·54	2
18·90	1 +	72·55	1	17·77	1 Er ?	69·85	1
19·45	1 +	72·93	6	18·30	1	70·9	1 + br, d
20·01	3	73·49	1 +	18·39	1	71·85	2
20·38	3	74·30	3	19·75	1	72·40	3 d

3474.07	5	3536.19	2	3593.10	3	3626.22	1
74.40	20	37.60	2	93.28	3	26.85	10
77.21	2	38.62	2	93.61	1	27.33	8
77.89	2	39.03	2	94.26	1	27.75	1
78.20	3 d	39.50	2	94.75	1	28.16	2
79.55	1	40.91	3	95.16	2	28.83	2
80.58	1	41.56	1 +	96.23	1	29.05	2
80.97	1 +	42.49	1 +	97.55	1	30.39	2
82.35	1 +	44.22	4	98.92	20	31.06	1
84.05	1 +	45.07	4	99.62	2	31.90	4
84.98	20	46.12	10	99.95	2	33.66	2
86.01	3	46.98	1	3600.51	1	34.05	1
86.49	1 +	47.73	1	00.88	3	34.49	1
86.98	1	48.31	2	01.10	3	34.83	3 +
89.74	5	48.66	2	02.02	3	35.43	2
91.10	3	49.10	3	02.18	2 +	36.05	1 +
93.25	5	50.00	1	02.65	1 +	36.45	1 +
93.75	1 +	50.34	2	02.80	1 +	37.31	1
94.25	1 +	51.78	1	02.94	1 +	37.41	1
94.65	2	56.91	8	05.04	1	38.47	4
94.92	15 d	59.19	2	05.92	1	38.84	2
97.00	1	60.30	3	06.26	2	39.14	1
99.02	4	62.80	1	07.57	1	40.05	1
99.23	5	63.29	2	08.30	1 +	40.38	2
3501.60	1	63.60	2	10.85	1 +	41.03	1
01.90	1 +	66.32	2	11.70	1 +	41.40	2
02.48	1 +	67.47	1	12.99	1	42.04	1
02.91	1	70.50	2	13.16	2	42.51	2
03.33	1	70.85	1	13.48	3	44.15	1 +
03.76	1 +	72.76	1	14.23	1	45.56	4
04.65	1	73.37	4	14.80	1	46.02	2
05.20	1	73.96	1	15.90	1 +	46.43	1
05.59	1	74.25	1	16.20	1	46.75	1
07.09	5	74.93	5	16.71	3	47.54	1
08.14	1	76.40	2	17.08	2 + d	48.56	1 +
08.50	1	77.00	1	17.37	1	48.95	2
09.50	3	78.15	1 +	17.99	1	49.77	1
10.85	2	79.27	2	18.25	2	50.45	2
11.91	2 d	80.89	2	18.60	2	50.95	1
13.20	1	81.97	1	19.58	3	52.75	2
15.73	20	84.64	1	19.90	1	53.01	2
18.25	1 +	85.18	1	20.15	1	53.15	1 +
20.07	5 +	87.93	1	20.30	1	54.60	3
20.31	4 +	88.83	1	20.73	1	55.04	1
20.91	1	90.87	1	22.53	1	55.78	1 +
24.14	2	91.38	2	23.30	1	56.55	1
25.04	1	91.52	2	23.74	2	58.50	1 +
31.89	5	91.95	1	24.47	1 d	58.63	2
35.09	2	92.37	4	25.61	3	58.79	1 +

3659.70	1	3686.19	1	3711.84	2	3757.41	20
60.40	1 +	86.50	1	11.98	1	59.40	1
60.86	1 +	86.80	3 d	12.55	2	59.89	1
61.67	1	88.13	1	13.05	3	60.63	2
61.91	1	89.25	2 +	13.61	1	61.47	1
62.42	10	90.05	1	14.01	2	62.06	1
63.13	3	90.38	1	14.82	1	62.20	1
64.10	1	90.50	1	15.30	1	65.39	1
65.36	1	90.80	2	16.60	1 +	66.37	3
66.80	3	91.41	3	17.39	1 +	66.96	1
67.20	3	91.60	3	18.06	2	69.22	2
68.12	5	92.10	2	18.77	2	71.23	2
68.69	1	92.80	5 r	19.47	1 +	72.54	2 +
69.20	3	93.63	1	20.89	3	73.98	1
69.67	3	93.86	1	21.48	4	75.00	1
70.10	1	94.39	5	21.98	4	75.80	1
70.44	3	94.84	1	23.51	1	76.30	2
70.85	1	94.97	2	23.77	1	76.70	2
71.80	3	95.84	2	24.60	3	81.15	2
72.45	3	96.05	1	25.10	1	86.30	3
72.84	2	96.41	2	25.20	1	86.95	2
73.31	1	97.10	1	26.14	3	88.20	2
73.50	1 +	97.46	1	28.15	1 +	88.57	2
74.25	2	97.84	1	29.68	3	91.98	2
74.51	3	98.35	2	31.55	4	96.88	10
74.92	4	99.13	1	31.94	1	98.40	2
75.68	2	3700.18	2	32.24	3	3801.45	3 +
76.25	1 +	00.43	2	32.74	3	03.70	1
76.74	3	00.73	1	34.25	1	03.81	1
77.77	3 (Fe)	00.87	2	36.50	3	04.30	2
77.90	2 +	01.42	1	37.80	3	10.46	1
78.24	1	01.50	1	38.28	1	10.85	10
78.76	3	01.77	1	39.46	1	11.99	1
79.34	3	01.95	2	40.10	1 +	13.39	8
79.85	3	02.50	5	42.55	1	13.80	1
80.15	2	03.35	1 +	42.76	2	16.89	1
80.90	1 +	04.70	2 +	44.20	1	30.64	1
81.74	1	05.15	1 +	45.15	1	35.50	1 +
82.15	2	06.70	1	45.22	1	37.60	1
82.80	3	06.90	1 +	47.57	1 +	37.75	1
83.23	2 +	07.05	1 +	47.97	1	41.46	1
83.95	2	07.39	1	48.32	30	42.20	1 +
84.16	1	07.56	1	48.99	1 +	44.01	3
84.46	1	07.79	2	52.32	2 +	46.83	1 +
84.65	1	08.00	1	53.16	1	54.23	4
85.10	1 +	08.37	1	53.63	2	57.13	1 +
85.31	3	09.92	2	53.90	10	63.02	1
85.53	1 +	10.90	4 +	54.60	1	71.55	1
85.95	1	11.45	3	56.70	1	72.29	3

26	1 +	3922.05	1	3969.76	1	3998.43
35	2	23.52	3 +	70.20	1 +	99.26
29	1 +	24.70	2 +	72.75	1	99.71
20	1 +	25.79	2	72.83	1	4000.60
60	1 +	29.48	1	73.20	2	00.77
24	1	30.06	2 +	73.74	2	01.40
10	20	30.80	1	73.95	2 + d	01.53
95	1	31.24	1	74.85	3	02.68
57	2	31.68	2	76.03	2	02.85
7	30	31.87	1	77.01	4	03.51
35	2	32.40	2	77.20	3	04.21
0	2	36.51	2	78.70	3	06.05
25	3	36.66	3	78.91	2 +	06.20
69	2 d	37.15	2	79.26	1	08.11
98	1	37.81	1	79.60	2	08.31
39	3	38.16	1	80.30	1	09.31
00	5	38.75	2	80.75	1	10.20
31	2	38.99	2	82.10	2	11.45
2	2	40.24	1	82.19	2	12.11
70	3	40.52	3	82.49	1	12.70
32	2	40.70	5	82.73	3 Y?	13.70
04	2	41.95	1	82.90	1 +	13.99
30	1	42.67	2	83.30	1	14.33
68	1	43.31	1	83.80	3	14.85
39	4	44.53	1	84.26	3	15.32
00	1	44.82	3	84.84	1 +	15.74
04	1	44.97	2	85.79	4	16.15
4	1	47.06	1	85.95	3	17.65
60	2	48.20	1	86.55	1 +	18.10
70	8	48.79	1 +	86.70	1 +	18.25
3	5	49.15	1	86.83	1 +	18.64
11	3	49.53	1 +	87.21	1	20.66
00	1	50.65	2	87.70	1	21.00
1	1	52.12	1	88.13	4 r	21.70
5	1	53.84	1	89.25	1	22.15
9	1	54.70	2	89.56	1	22.87
5	2	55.20	2 d	90.50	1	23.01
9	2	55.89	3	91.46	2	23.88
1	1	57.54	2	92.00	1	24.08
0	2	57.94	2	92.40	1 +	24.21
5	1 +	59.66	2 +	92.70	1 +	24.56
5	2	59.83	2	92.87	2	25.04
4	1 +	59.99	2	93.00	1 +	25.54
5	1 +	62.74	1	93.86	5	27.35
0	1 +	63.42	3	94.68	1	27.92
9	1 +	64.62	2	95.45	1	28.49
9	1 +	66.50	1	96.32	1 +	28.56
0	2	67.00	1	96.85	3	29.00
5	2	69.55	1	97.32	3	31.90

4032-03	1 +	4081-40	2 Er	4172-39	1	4256-51	2
32-64	2	83-82	3	73-39	10	58-78	3
33-83	1	85-24	1	73-66	2	64-23	5
33-93	1	87-50	1	83-83	2 +	66-20	4
35-87	1	87-80	3	87-00	3	66-75	1
36-25	1	91-74	2 +	87-79	2	69-70	2
36-49	2	92-20	1	91-84	2	72-09	1 +
36-70	2	97-04	2 (Cy)	94-50	4	73-79	3
37-75	3	98-27	2	95-04	3	75-26	1 +
38-66	1	4100-74	1	98-24	2	76-65	1
39-01	4	01-24	3	4201-50	1	76-85	1
40-99	8	03-45	3	02-40	1	77-33	1
42-13	1	03-99	10	03-37	2	78-20	1 +
42-40	1	04-45	1	03-55	2	81-00	2 +
43-15	1	05-19	2	03-93	1	81-87	3
45-58	20	06-00	1	04-84	2	84-70	3
46-10	10	06-65	2	06-74	1	86-70	3
47-10	1	07-51	1	11-40	3	90-33	3
47-65	3	08-78	10	11-89	5	92-22	1 +
48-50	1 Er	10-06	2	13-31	3	95-17	3
48-94	1	11-50	2	15-30	2	96-47	1 +
49-65	1	12-14	2	16-70	1 +	98-5	2 + br
50-73	2	12-81	1	16-90	1 +	98-8	2 + br
52-48	1 +	13-87	1	18-23	3	4301-25	3 +
52-60	1 +	16-88	2	18-59	2	01-78	3
53-30	1 +	19-50	3	19-26	1	03-99	1
54-07	10	20-35	5	21-23	4	08-81	4
54-64	4	24-80	1	21-84	1 +	11-20	3
55-30	1	25-80	4	22-42	3	15-20	2 +
55-64	2	27-31	10	23-63	3	20-10	1 +
56-00	1	29-59	3	25-29	3	24-36	2
57-70	2 d	31-69	1	29-65	5	25-30	2
58-70	1 +	34-02	1	30-33	2	26-55	1 +
59-53	1 +	34-71	3	31-01	1	29-15	1 +
59-66	1	35-23	1	31-40	1 +	30-80	5
59-95	2	36-39	4	32-16	2	32-71	3 + d
60-45	3	41-74	1 +	33-10	1 +	33-55	1
61-17	1 +	42-34	2	34-95	1	34-15	1 +
62-20	1	43-02	3 Y?	39-99	2	35-90	1 +
63-13	1	43-26	1	42-30	1 +	37-29	5
65-25	10	46-23	2	43-92	3	39-82	1
67-19	2	49-12	1	45-55	3	40-42	1 +
67-73	2	51-29	3	46-05	1 +	45-60	1
68-20	3	52-70	5 +	47-50	1 +	46-82	3
69-07	1	52-91	4	48-15	1 +	47-12	3
72-80	1	60-03	1	49-10	1 +	48-50	1
73-28	3	63-19	5	49-53	1 +	50-90	10
78-15	3 +	67-69	1 +	52-13	2	52-15	1
79-55	1	68-18	3	54-59	20	56-90	8

4358.64	1	4431.56	2	4594.20	1	4729.23	1	
58.90	3	33.40	1	94.80	1	31.80	1	
60.10	1	39.59	1	95.29	1	32.05	1	
60.80	1+	44.80	2	4606.80	3	38.18	1	
64.10	4	45.24	2	08.85	3	42.22	10	
64.35	2	47.40	3	09.50	4	49.20	2+d	
66.90	1	49.85	3	09.70	4	51.70	2	
69.05	1	56.80	1+	12.45	3	54.50	1	
69.34	1	59.40	1	13.45	1	55.19	1+	
69.55	1	60.17	1	13.55	1	57.19	2	
69.75	1	63.55	2	14.19	1	59.85	2	
70.15	2	63.82	2	17.48	1	62.57	2	
71.59	3	67.45	1	19.02	1+	62.83	1	
73.50	2	68.31	1	20.23	1	63.75	1d	
74.27	1	71.55	2	28.40	2	66.61	1+	
74.45	2	73.75	3	28.89	1	72.13	1+	
76.75	2	77.80	5	29.28	8	77.66	2	
76.87	2	81.09	1+	31.06	1	79.60	1+	
79.31	3	82.75	1	38.37	2	81.37	1+	
80.00	2	84.74	4	38.48	2	83.10	1+	
80.63	1	87.65	1	40.79	1	87.77	1	
81.85	1	90.56	1	47.43	2	91.66	1	
84.92	3	91.25	1	49.95	8	92.91	1+	
85.11	3	94.05	2	51.57	2	95.67	1	
86.56	1	4500.94	2	52.89	1	96.10	1	
88.86	1	03.45	2	55.00	1	96.48	1+	
90.70	2	10.98	3	58.00	1	4801.50	1+	
93.38	1	11.50	1	61.51	5	07.00	1	
93.80	1	12.71	3	64.88	1	08.69	1+	
95.15	2	13.20	2	65.65	1	13.10	1+	
98.21	4	26.12	2	74.80	4	14.90	1	
4400.71	3	26.31	3	75.81	3	20.54	2	
01.40	3	30.25	3	79.25	1	23.50	1	
03.44	3	31.45	3	82.52	1	31.35	1	
04.30	1+	31.79	5	83.26	1	32.49	3	
04.50	1+	Ti?	34.75	2	86.01	3	33.50	1+
09.52	3	49.10	3	87.57	1	33.97	1+	
12.05	1+	58.58	2	88.38	2	55.80	1+	
15.96	1+	62.70	3	90.72	1	68.40	2+	
16.70	1+	63.48	1	93.05	1	89.85	1+	
18.85	1	68.00	2	93.80	1	96.62	1	
19.45	1	68.15	2	4701.34	2	4907.17	2	
19.76	3	72.61	2	01.87	2	39.19	3	
20.71	4	78.01	2	10.02	3	48.36	1	
22.72	3	80.20	2	11.7	1+	59.60	1+	
24.71	1	88.14	1	17.70	2+	67.39	5	
26.36	1d	89.10	1	22.90	1	80.15	2	
26.93	1	89.58	3	24.74	1	95.23	1+	
29.96	3	89.94	2	28.90	1	5013.46	1	

5042·55	1	5251·99	1 +	5360·17	2	5922·00	1 +
93·25	1	75·65	1 +	5860·50	1 +	83·13	1 +
5193·02	1 +						

XLV. Ni. Nickel.

Ältere Messungen: B. Hasselberg, Stockholm. Akad. 28 (1896).
L. Stütting, Ztsch. für wiss. Phot. 7 (1909).

Material: Metall von Trommsdorff.

Verunreinigungen: Ag, Co, Cu, Fe, Mg, Mn, Pb, Sn, Zn.

Linienzahl: 976.

2216·52	1	2314·07	2 +	2376·12	1	2467·07	1
23·04	1	16·14	2	79·81	1	72·21	1
24·94	1	17·22	2 +	80·94	1	72·32	1
26·41	1	18·88	1	84·50	1	73·03	1
44·6	1 +	20·19	4 u	85·10	1	73·27	1
53·75	1 +	21·55	3 +	86·70	1	76·99	1
53·97	1	22·07	1	87·67	1	79·90	1 +
64·60	1	22·81	2	87·87	1	83·40	1
70·34	1	24·79	2	89·01	1	84·16	1
74·0	1 +	25·90	3 +	93·10	1	84·26	1 +
74·8	1 +	26·56	1	93·20	1	88·26	1
78·90	1	30·10	2	94·66	2	89·13	1
79·7	1 +	31·83	1	96·50	1	90·78	1
86·78	1 +	34·70	1	96·79	1	91·29	1
87·23	1	37·20	1 +	2401·95	1	92·27	1
88·54	1 +	37·60	1 +	12·80	1	2501·26	1 +
90·12	1 +	37·95	1 +	16·26	2	10·99	2
93·25	1 +	38·6	1 +	19·44	1	11·06	1
94·01	1 +	45·60	2 u	21·36	1	24·30	1
96·69	1	46·21	1 +	23·47	1	28·14	1
97·26	1	46·73	1	23·80	1	29·15	1
97·60	1	47·61	1	24·16	1	32·20	1
98·36	1	48·83	1	32·34	1 Co?	36·06	1
2300·90	1 +	50·59	1	34·53	1	40·14	1
01·68	1 +	53·81	1 +	36·80	1	44·35	1
03·10	2	55·15	1	38·00	2	46·01	1
06·55	1 +	56·70	1	39·15	1	47·51	1
07·45	1	56·99	1	40·02	1 +	53·49	1
08·27	1	58·99	1	41·76	2	59·86	1
09·60	1	60·75	1	41·90	1	61·55	1
10·15	1	62·19	1	50·57	1	62·22	1 +
11·09	3 u	65·78	1	51·14	1	67·47	1
12·43	3 u	67·47	1	54·11	1	74·48	1
13·72	1 +	75·54	1	65·40	1	78·55	1

2	3031.98	3	3210.00	2	3326.80	1
1 + (Co)	36.19	1	13.53	2	27.52	1
1	38.04	15 u	14.17	4	28.85	2
2	45.15	4	16.93	3	32.31	2 +
1 +	48.98	1	17.93	4	34.31	1
1	50.92	20 u	19.92	1	35.72	1 +
1	54.42	10	21.41	3	37.15	1
3	56.33	1	21.81	5	37.98	1
1	57.76	15 u	23.66	1	38.90	1
1	63.53	1	25.19	6	39.20	1
3	64.75	6	27.11	4	54.55	1
2	66.59	1	33.06	10	59.30	2
1	76.01	1	33.28	2 +	61.44	1
2	80.91	5	34.00	1	61.75	6
1 +	97.00	1 +	34.78	5	62.28	1
2	97.27	5	35.86	1	62.97	2
4	99.25	4	43.20	8	63.76	2
2	3101.67	10 u	45.47	1 +	64.75	2
2	01.99	10 u	48.56	4	65.92	5
1	05.60	5	49.55	3	66.32	5
1	07.83	2	50.90	5	66.95	3
2	14.26	5	64.56	1	68.05	3
1	16.84	1	68.21	1	68.98	1
1	21.55	1 + d	69.08	1	69.71	15 u
3	29.42	3	71.25	4	72.19	6
2	32.68	1	73.62	1 +	74.42	4
1 +	34.22	30	76.66	1 +	74.82	4
1 +	37.43	1	77.35	1 +	75.70	1
1	45.23	1	79.96	1	76.46	1
1	45.82	3	82.03	2	80.71	10 u
6	51.33	1	82.81	3	81.01	3
1	54.68	1	82.96	3	85.34	1
1	59.65	1	83.65	1 +	87.54	1
2	64.30	1	84.56	1	88.26	1
1	65.64	1	87.08	4	89.5	1 +
1	70.86	1	87.36	1 + Co?	91.20	10
8	76.44	1	93.83	1	93.10	20 u
2	81.89	3	96.42	1	96.31	2
4	83.14	2	3305.10	2	97.37	1
2	83.40	2	07.16	1	3401.31	3
6	84.50	4	09.56	1	03.58	3
8	91.97	1	10.35	2	09.74	5
15 u	94.20	1	12.49	3	13.66	5
10 u	95.67	3	13.15	2	14.12	4
1	97.22	5	15.82	10	14.91	30 u
15 u	99.44	1 +	20.42	8	20.88	2
1	3200.50	3	20.92	2	21.49	3
4	02.21	3	21.36	1	22.47	1
1	07.05	1	22.50	8	23.00	1

3423.87	10	3524.68	50	3688.59	3	3972.32	2 r
33.74	15	26.67	1	89.43	1	73.71	4
35.63	1	28.13	4	94.07	3	74.82	2 +
37.45	8	28.70	1	97.05	1	78.78	1
42.17	1	29.02	1	3713.50	1	84.29	1 +
42.67	1	30.73	2	13.84	1	86.97	1
43.03	1	37.35	1	15.65	1	87.25	1
43.14	1	37.72	1 +	22.64	5	94.15	1 +
44.36	2	42.14	1	24.95	1	4006.30	1
46.40	30 u	45.30	1	29.06	1	17.67	1 +
53.02	10	48.32	6	30.90	1	22.8	1 + br
55.35	1	51.71	3	36.98	4	24.15	1 + br
58.60	20	53.64	3	39.40	3	25.6	1 + br
61.80	20	60.05	1	39.94	1 d	26.47	1
64.25	1 +	61.90	3	44.72	2	27.8	1 + br
67.61	4	66.51	20	49.19	3	64.55	1
67.77	2	72.02	10	54.57	1	75.00	1
69.65	5	76.08	1	57.47	1	98.30	1
71.50	1	77.36	1	62.76	1	4116.11	1
72.71	10	85.29	2 + (Co)	68.38	1 +	23.94	1
76.80	1	88.07	4	69.60	1	42.49	1 +
78.00	1	97.86	10	71.94	1 +	50.53	1 +
78.42	1	99.66	1	72.67	2	52.45	1 +
79.36	1	3602.41	5	75.75	8	64.80	1
80.30	1	04.41	1	78.20	1	67.07	1 +
82.87	1	07.00	1	83.72	8	67.81	1
83.98	8	09.48	5	90.36	1	84.65	1
85.25	1	10.61	10	92.48	2	95.72	2
86.09	4	11.59	1 +	93.79	3	4200.60	2
88.43	1	12.90	6	3807.35	8	01.89	2
93.11	30	19.52	50 r	08.26	1	02.32	1
94.84	1	24.89	3 d?	12.20	1 +	31.19	2
96.47	2	30.03	1	23.68	2	36.5	1 +
96.81	1	35.10	2	24.03	1	75.26	1
99.37	1	41.75	1	31.89	5	84.84	2
3501.02	6	42.52	1	33.00	1	88.15	3
02.73	4	44.07	1	34.00	1	96.05	2
07.85	4	47.85	1	58.51	20	98.67	1
10.52	15	49.63	1 +	89.84	2	4307.51	1
11.76	1	56.71	1	3906.45	1	25.52	1
12.08	1	57.87	1	09.10	1 +	25.78	2
13.64	2 (Co)	62.10	2	12.47	1 +	30.90	1
14.10	5	64.27	4	13.14	1	31.83	3
15.21	30	64.75	1	17.25	1 +	55.30	1
16.33	2	66.16	1	42.00	1 +	56.07	3
18.80	3	68.36	1	44.29	2 +	58.0	1 +
19.97	4	69.40	3	54.7	1 +	59.76	5
23.23	1	70.60	4	62.25	1 +	67.5	1 +
23.61	3	74.30	6	70.65	2 +	68.47	2

4370·20	2	4463·60	2	4629·52	2 Co?	4762·82	2
72·35	1 +	66·54	2	31·3	1 + br	64·15	3
73·74	1 +	67·10	1	34·85	1 +	68·28	1
75·02	1	68·10	1	38·1	1 + br	73·08	1
76·04	2	70·64	10	39·8	1 + br	73·62	1
79·25	1	71·35	1	44·2	1 + br	86·47	1
80·2	1 + br	79·59	1	47·53	2	86·75	15
80·9	1 + br	80·80	2	48·85	15	87·49	1
83·0	1 + br	81·39	1	53·48	1	91·18	1
84·70	3	84·70	1	55·83	2	91·50	1
86·65	2	90·71	2	57·55	1 +	93·65	1
88·48	1	92·50	1	58·10	1 +	96·02	1
90·05	2	4501·84	1	62·77	1 +	99·65	1 +
90·55	2	06·46	1	67·12	2	4800·01	2
91·73	1	09·56	1	67·92	2	07·20	3
92·07	1	11·48	5	68·80	1	08·70	1 +
92·45	1	13·13	2	71·83	1 +	09·11	1
92·84	1	17·97	1	74·90	2	12·19	2
95·40	1 +	20·15	3	75·74	2	13·13	1 +
96·04	1 +	22·07	1	86·39	6	14·80	1
97·05	1 +	34·90	1	91·08	1	16·10	1 +
97·42	1 +	37·48	1 +	95·76	1	18·00	2 +
98·80	2	42·5	1 + br	98·60	2	21·32	2
99·78	3	47·11	3	4700·43	1 +	29·20	10
4400·42	1	47·38	3	01·70	8 v	31·37	5
01·02	2	49·81	2 (Co)	03·97	5	32·90	3
01·75	15	51·49	2	05·68	1	33·93	1 +
02·45	1	53·30	2	06·10	1	34·90	1 +
06·08	1	54·71	1	12·22	2	36·08	1
09·29	1	60·11	2	14·60	15	36·45	1 +
10·66	5 +	66·75	1 + (Co)	15·95	10	36·95	1 +
19·30	1	67·59	1	19·25	1	38·78	3
19·90	1	74·20	1 +	20·62	1	42·19	1 +
23·19	2	80·78	2	24·00	1 +	43·30	1
25·00	1 +	84·53	1	27·63	2 Mn?	45·35	1 +
31·30	1 +	88·85	1	28·02	2	52·77	2 +
31·78	1 +	90·25	1 + br	28·60	1 +	53·45	1 +
33·38	1 +	92·72	10	29·43	2	53·92	1 +
34·02	1 +	95·08	2	31·98	3	55·59	10
35·50	1	96·07	2 +	32·63	3	57·57	3
37·15	3	4600·56	8	33·40	1	64·10	2
37·78	3	05·17	10	35·00	1 +	64·49	2
41·60	1	06·38	3	36·68	1 +	66·47	8
42·58	3	10·2	1 + br	40·31	2	71·01	3
45·82	1 +	14·25	1 +	52·29	2	73·62	8
50·34	2	14·75	1 +	52·59	3	74·97	2
59·19	10	18·11	1	54·92	3	87·18	2
59·96	1	20·55	1	56·70	8	4901·15	1
62·63	8	25·88	1 +	58·60	1	04·61	10

4912.19	3	5081.29	8	5346.98	1+	5642.10	3
14.10	3	82.52	3	47.80	1+	42.83	1+
18.52	3	84.20	5+	53.60	4 (Co)	43.30	2
18.86	1	85.62	2	71.60	8 (Fe)	49.89	3
25.72	3	88.66	2	76.4	1+ br	64.23	3
30.97	1	89.10	2	77.80	1	70.18	2
34.21	1	94.50	3	78.1	1+ br	82.42	8
36.00	5	97.07	4	88.54	2	89.39	1
37.45	5+	99.51	4	92.55	3	91.72	1
45.62	2	5100.12	8 r	5411.41	8	95.19	10
46.17	1+	03.15	3	24.87	5	5700.44	2 Cu?
52.46	1	15.57	10	29.05	1+	09.76	10
53.38	3	21.75	3	30.5	1+ br	12.10	5
65.31	1	25.38	8 (Fe)	36.08	8	15.29	10
67.70	1	28.20	1+	53.00	1+	48.58	3
71.50	3	29.55	10	53.50	2+	49.45	1+
76.30	1+	30.53	2	60.70	1	54.89	8
76.50	1+	31.93	4	62.69	5	61.03	8
80.34	10	37.23	8	68.32	2	81.00	1+
84.31	10	39.43	4 (Fe)	69.55	1+	82.36	4 Cu?
97.01	2	42.91	15	75.77	1+	96.32	1
98.40	2	46.61	20	77.12	30	98.45	1+ br
5000.51	8	48.82	1	78.05	1	5805.40	15
03.92	2	55.31	3+	81.10	2	31.82	10
10.21	3	55.90	10	83.55	2	47.20	3
11.13	3+	58.16	2	93.53	1+	58.00	20
12.64	4	67.63	3 (Fe)	95.15	3	64.14	1+
14.40	3	68.81	10	99.0	1+ br	88.56	1
17.73	8	72.88	3 (Mg)	99.6	1+ br	93.11	10
18.48	5+	76.72	8	5504.31	2	5906.70	1+
22.77	1+	79.30	2	10.20	6	24.23	2
26.68	1	84.78	5+	15.00	1+	97.02	4+
32.92	2	86.73	2	21.62	1+	97.80	3+
35.52	20	88.02	1	37.31	1+	6007.54	3
36.11	5+	92.66	3 (Fe)	53.93	3	12.48	2
38.75	4	96.76	1	78.94	5	25.95	1+
39.50	3	97.35	3	88.09	5	30.89	2
41.20	2	5216.58	3	89.58	4	53.91	4
42.37	5	20.30	5	91.00	1+	86.53	20 r
48.25	2	35.61	4	92.49	8	93.37	1+
49.00	5	43.93	1+	93.99	8	6108.36	8
51.71	3	45.77	1+	5600.30	4	11.22	5+
53.45	1	48.55	1+	07.26	1+	16.35	20
58.18	3	49.15	1+	15.01	6	20.02	2
68.00	2	55.52	1	25.52	8	29.19	3
68.98	2	59.72	1+	28.55	2	30.40	6
76.50	2	65.90	2	37.33	3	34.2	1+ br
80.15	2	68.52	4	38.99	1+	36.85	1+
80.70	8	81.85	2	41.43	1+	37.95	1+

·26	1 +	6224·18	8	6339·40	20	6576·55	1 + br
·60	10 +	30·33	4	60·93	8	80·38	2 +
·76	3	56·60	8	64·78	1	86·52	5
·69	20	58·87	3	66·61	10	92·69	2 +
·00	30	59·79	3 +	70·61	3	98·74	4
·41	3	72·10	1	78·40	15	6635·32	3
·70	1	72·95	1	84·90	8	43·89	10
·25	1 +	6314·3	1 + br	6414·88	6	6767·99	5
·11	1	14·89	15	21·68	10	72·55	2
·00	8	16·7	1 + br	25·18	2 +	6842·3	1 +
·27	1 +	18·21	1	83·08	6	6914·83	1
·48	8	22·31	3	6502·53	1 +	7122·54	1
·78	5	27·79	5	33·11	3		

XLVI. O. Sauerstoff.

Die Messungen: Fehlen.

Material: Atmosphärische Luft.

Atomzahl: 0.

XLVII. Os. Osmium.

Die Messungen: H. A. Rowland und R. R. Tatnall, Astroph. Journ. II (1895). H. Kayser, Berl. Akad. (1897). J. M. Eder und E. Valenta, Wiener Akad. 119 II a (1910) (Rot).

Material: Metall von Heraeus, mit Zn legiert.

Unreinigungen: Pt, Ru.

Atomzahl: 1340.

Wischen λ 3513—3902 und λ 3949—4351 auf Kupfer gemessen,
auf Gaskohle.

·97	1	2370·79	1	2403·95	1	2450·85	1
·35	1	71·27	1	05·55	1	51·84	1
·76	1	77·11	1	06·06	1 +	54·00	1
·40	1 +	77·66	1	08·76	1	56·55	1
·07	1 +	79·46	1	14·63	1 +	61·51	2
·37	1 +	79·70	1 +	18·07	1	64·11	1 +
·89	1 +	79·90	1 +	18·61	1	64·59	1 +
·50	1	84·71	1	24·67	1	72·37	1
·10	1	87·37	1	24·82	1	76·93	1
·00	1 +	94·00	1 +	25·06	1	81·89	1
·35	1 +	94·40	1	26·90	1	82·50	1
·50	1	95·99	1	31·30	1	86·33	1
·85	1	96·88	1 +	31·70	1	88·64	2
·46	1	2401·23	1	46·00	1	91·11	1
·34	1	02·31	1	46·11	1	91·76	1

2492.46	1	2589.50	1	2661.29	2	2764.05	1
93.70	1	89.59	1	62.63	1	64.15	2
98.50	2	90.87	2	66.08	1 +	65.55	1
2500.01	1	92.10	1	66.31	1 +	67.25	1
00.80	1	94.25	1	69.61	1	70.00	1
01.00	1	96.11	1	70.66	1 +	70.22	1
02.38	1	96.81	1	74.68	2	73.18	1
04.49	1	97.32	1	75.00	2	74.13	1
04.59	1	97.38	1	79.83	1 +	74.25	1
08.71	1	97.69	1	82.30	1	74.50	1
10.04	1	99.25	1	84.30	2 (Zn)	75.01	1
12.98	1	2600.03	1	88.18	1	77.01	1
13.34	1	00.56	1	89.44	1	82.69	2
15.13	1	00.86	1	89.89	3	86.41	2
18.00	1	02.43	1	92.77	1	86.90	1
18.52	1	03.30	1	94.61	1	94.10	1
19.86	1	04.70	1	94.86	1	94.30	1
26.10	1	09.30	1	97.34	1	96.84	2
27.15	1	09.67	2	99.68	2	2804.19	2
32.53	1	10.89	2	2700.82	1	07.03	3
34.25	1	11.45	1	02.50	1	09.04	2
38.10	1	12.75	2	02.92	1	13.94	2
38.17	1	13.17	2	04.55	1	14.34	2
40.25	1	16.05	1 +	06.04	1	14.98	1 + +
40.85	1	20.05	2	06.80	2	15.40	1 + +
42.60	1	20.75	1	07.51	1	15.90	2
43.90	1	21.50	1	08.27	1	20.30	1
46.25	1	21.95	2	09.96	1	20.66	1
47.80	1	28.56	2	14.74	2	21.37	1
54.55	1	32.99	1	15.46	2 +	24.27	1
55.20	1	34.38	1 +	15.72	1	29.40	2
55.35	1	34.55	1 +	20.15	2	32.35	1
55.90	1	37.25	3	21.97	2	37.53	2
56.17	1	38.10	1	28.36	1	38.28	2
57.87	1	41.30	1 +	32.90	2	38.74	4
58.20	1	43.74	1	40.42	1	41.70	2
62.78	1	44.23	3	40.70	1	44.51	3
64.50	1	47.00	2 Pt?	40.84	1	44.80	1
65.28	1	47.82	2	41.50	1	46.50	2
66.62	2	49.43	2	48.01	1	46.65	1
68.95	1	53.06	1	48.97	1	48.35	2
71.25	1	53.86	1	49.30	1	49.15	1
71.90	1	55.29	1 +	51.25	1	49.40	1 + +
72.60	1 +	55.89	1 +	53.83	1	50.89	3
78.26	1	56.76	2	57.91	1	55.45	1
78.42	1	58.69	3	58.95	1	57.65	1
81.17	1	59.55	2 Pt?	61.21	1	60.17	1
82.06	2	59.91	2	61.54	2	61.09	3
87.56	1 +	61.05	1	63.39	2	65.80	1

2872.52	1	2962.45	2	3049.17	1	3109.79	1
74.73	1	64.21	2	49.58	2	10.75	1
75.07	2	64.75	1	50.53	2	11.20	2
77.46	2	68.55	1	51.29	1	14.92	1
78.52	2	70.80	1	52.55	1	15.13	1
84.55	1	71.10	3	55.09	1	16.59	1
86.65	1	72.36	1	55.33	1	18.00	1
91.00	1	75.45	1	57.03	1	18.24	1
91.98	1	77.75	2	58.80	8	18.44	2
92.47	1	78.31	1	60.44	2	20.00	1
95.19	1	78.63	1	62.31	3	20.77	1
96.19	2	79.54	1	62.59	1	24.14	1
2901.45	1	82.25	1	62.80	1	25.05	1
03.21	1	82.70	1	66.25	2	28.55	1
03.34	1	83.05	2	66.71	1	29.35	1
05.85	1	84.43	1	66.97	1	30.14	1
06.09	1	85.75	1	69.25	1	31.23	3
08.15	1	87.76	1	70.05	2	31.62	1
09.20	8	88.37	1	70.38	1	37.65	1
09.79	1	89.25	1	74.21	3	40.44	1
11.47	1	89.65	1	75.06	2	41.06	1
12.47	5	92.24	1	76.86	1	43.19	1
13.96	1	93.70	1	77.16	2	44.50	1
14.84	1	97.75	2	77.55	2	46.08	1
17.37	3	3003.62	1	77.82	4	49.93	1
17.94	1	07.00	1	78.20	3	52.19	2
19.94	4	08.05	1	78.48	2	52.80	3
21.20	1	10.05	1	79.67	1	53.72	3
24.64	1	12.52	1	84.72	1	55.45	1
25.41	1	13.22	3	86.40	1	56.38	8
25.69	2	15.77	1	87.86	1	56.89	3
29.62	2	17.38	3	88.37	1	57.11	1
30.32	1	18.16	4	90.21	2	57.35	2
30.69	1	19.50	3	90.42	1	59.48	1
31.42	2	20.63	2	90.62	1	60.44	1
34.75	2	29.03	1	91.38	1	60.57	2
42.32	1	30.83	4	93.70	2	61.55	2
42.96	2	31.13	1	94.20	1	61.86	2
48.33	4	31.41	1	99.38	1	64.75	2
49.63	3	32.94	1	3101.64	3	66.62	3
49.93	1	41.03	4	02.50	1	68.39	2
50.00	1	42.85	1	03.53	1	71.75	1
52.45	1	43.62	2	05.09	2	72.96	1
55.13	1	43.78	2	06.10	3	73.31	2
56.62	1	44.20	1	07.49	1	74.05	1
57.20	1	44.54	1	08.00	1	75.77	1
58.48	1	45.04	1	08.08	1	77.51	1
61.15	2	45.43	1	09.09	3	78.18	5
62.29	2	45.90	1	09.50	3	78.36	1

3179.37	1	3242.11	1	3318.01	1 +	3386.06	2
80.23	1	45.79	1 +	18.31	1 +	86.27	2
81.99	3	48.14	2 +	18.74	1 +	86.76	1
82.35	1	50.50	1	20.05	1 +	88.00	6
82.68	2	51.03	1	20.58	1 +	88.46	1
82.92	1	52.14	2	22.20	1	88.79	1
84.46	1	55.04	3	23.30	1 +	89.64	1
85.42	3	55.41	1	24.51	3	91.41	1
86.65	1 d	57.05	3	24.89	1	94.72	2 Ti?
87.08	3	59.56	1 +	26.55	1	95.85	2
87.45	2	60.43	3	26.65	1	97.90	1
89.56	3	60.70	1	27.59	4	98.71	1
91.31	1	62.44	8	29.26	1	3400.26	1
93.99	2	62.89	4	29.35	1	01.31	2
94.37	3	64.85	1	34.00	1	02.01	6
94.80	2	66.89	1	34.30	1	02.66	6
95.50	3	67.34	1	35.62	1	06.45	2
96.11	3 d	68.10	10	36.30	8	06.83	2
97.30	1	69.36	5	37.28	1	08.90	2
98.26	1	70.05	1	40.85	1	12.91	2 d?
3200.89	1	71.02	1	42.05	1	14.38	2 +
02.95	2	72.12	1	48.79	1	15.36	1
03.44	1	72.30	2	51.90	3	21.34	1
04.64	1	72.63	1	54.05	3	21.85	2
05.90	1	73.54	1	57.69	1	22.43	1
12.85	1	75.31	4	58.11	3	27.56	1
13.44	1	76.54	1	59.90	1	27.79	3
13.59	1	78.09	4	61.31	3	30.10	1
17.17	1	79.55	1	62.72	1	30.20	1
18.15	1	81.06	2	63.09	1	35.04	1
19.26	1	84.68	1	64.29	3	35.40	1
20.36	2 d	86.81	1	64.50	1	38.76	1
21.53	1 +	88.57	1	66.04	2	39.63	2
23.99	1	88.96	2	70.37	3	39.97	1
27.41	2	90.40	4	70.74	8	44.60	3
29.35	1	91.25	1	71.69	1	45.69	3
30.53	1	93.29	1	72.21	3	49.36	5
31.45	1	3301.70	10	72.70	1	50.54	1
31.56	1	05.51	1	73.21	1	53.17	1
32.19	8	06.34	3	73.35	1	55.16	2
32.67	1	09.83	1	74.35	1	56.27	1
34.34	1	11.05	4	75.28	1	58.54	4
34.81	1	12.18	1	76.80	1	59.15	2
34.86	1	13.60	1	77.10	1	62.35	1
38.30	1	14.88	1	77.75	1	65.03	1
38.75	3	15.56	2	78.80	2	65.59	3
41.18	3	15.83	2	81.81	2	69.51	1
41.56	1	16.81	2	84.16	5	74.25	1
41.94	1	17.40	1 +	84.74	2	76.98	1

1	3541.68	1	3598.25	10	3671.05	10	
3	42.03	2	3602.00	4	71.60	1	
3	42.85	5	02.64	2	73.01	1	
3	43.43	1	02.99	1	74.67	1	
3	43.85	2	04.02	1	75.60	4	
3	44.70	2	04.50	1+	78.15	2	
2	46.25	1	04.65	2	78.40	1	
1	48.03	1	05.97	1	81.74	3	
2	48.87	1	07.54	1	84.00	1	
1	49.17	1	09.30	3	84.70	2	
2	49.65	2	09.83	1	85.55	1	
2	49.81	2	13.50	3	87.19	1	
1	50.86	1	15.77	1	87.40	1	
1	51.09	1	16.73	8	88.05	1	
3	54.20	1	19.59	3	89.21	5	
1	54.70	1	20.40	2	90.88	2	
1	55.85	2	21.26	1	92.41	1	
4	56.11	2	25.53	1	92.80	1	
1	58.10	1	26.05	1	93.15	1	
1	58.96	1	27.39	1	94.53	1	
6	59.97	10	30.12	3	95.35	1	
1	Ti?	60.61	1	30.56	1	95.80	1
1	61.03	10	30.95	1	98.98	2	
1	61.55	1	31.95	1	3700.45	2	
2	62.51	4	35.40	1+	01.45	1	
5	64.25	2	38.20	1	01.75	2	
2	67.23	1	38.72	1	02.95	2	
3	68.75	1	39.44	1	03.40	4	
2	69.17	1	40.50	8	06.72	4	
2	69.94	4	41.40	2	09.30	5	
3	71.70	1	42.65	2	12.00	2	
1	72.93	1	45.28	1	12.60	1	
2	74.25	3	48.45	2	12.99	2	
3	77.65	1	48.94	3	13.88	4	
2	80.01	1	50.52	2	14.13	2+	
1	80.68	1	53.35	2	16.38	1	
5	81.95	1	53.86	3	16.48	2	
1	83.21	2	54.64	5	17.00	1	
3	83.55	2	54.95	1	17.54	1	
10	84.56	2	56.55	1	18.06	2	
3	86.65	3	57.05	10	18.49	3	
2	87.48	4	57.57	1	18.87	1	
8	88.11	1	60.92	1	19.64	10	
4	89.48	1	61.40	2	20.27	10	
1	90.28	3	66.48	4	22.11	2	
1	91.77	1	68.34	1	25.45	2	
1	92.49	3	69.25	1	26.13	1	
1	95.96	1	69.63	1	28.52	2	
1	97.66	2	69.85	1	28.85	1	

3729.37	3	3781.99	1 +	3845.81	1	3922.15	2
30.88	3	82.34	20	46.55	2	25.25	2
31.95	2	82.90	1	47.07	1	26.93	2
32.99	1	83.82	2	47.71	1	27.40	1
33.50	1	85.82	1	48.94	1	28.31	1
34.70	1	85.88	1	50.11	10	28.57	2
35.36	1	86.14	1 Ti?	53.60	3	28.68	3
35.66	2	89.04	1	53.75	2 +	30.14	3
40.20	1	89.25	3	54.86	2	31.70	2
40.39	1	90.29	10	57.24	10	35.67	1
41.22	2	90.90	4	60.95	1	38.74	6
41.66	2	91.23	1	65.19	2	39.71	2
43.80	1	92.18	1	65.59	6	40.20	1
44.00	1	94.08	15	66.19	1	49.93	3
44.52	1	94.84	3	66.65	2	52.91	2
46.60	4	95.83	3	68.83	2	54.72	1 +
47.18	1	97.86	1	69.15	1	55.53	2
49.18	2	3800.06	1	73.17	1	57.80	1 +
49.99	1	00.58	3	73.86	2	60.65	3
50.72	2	00.90	1	75.26	1	63.48	1
50.95	2	01.23	1	75.82	1 +	63.80	15
51.45	2	01.40	1 +	76.91	10	65.08	3
52.06	2	01.75	2	77.45	2	69.82	4
52.69	20 d	02.77	2	78.05	1 +	74.00	1
53.99	1	04.27	1	78.65	3	75.59	3
54.65	1 +	09.80	1	80.93	2	77.39	15
56.70	1	10.59	1	82.02	4	79.53	1
56.91	1	12.45	2	84.75	1	88.32	2
57.21	3	14.20	1	85.90	2	88.76	1
58.25	1	14.42	2	86.91	2	91.66	2
60.40	2	17.78	2	88.97	1	95.10	2
64.83	1	18.21	2	91.75	1	96.99	2
66.43	4	18.80	2 Pt?	92.99	1	99.10	2
68.27	4	21.80	2	93.40	1 +	4001.50	1
69.44	1	22.06	2	94.83	1	03.64	4
70.48	1	23.47	1	95.05	1	04.18	3
71.00	1	26.78	2	95.34	2	05.29	4
71.78	2	27.30	3	97.30	1	11.14	1
72.09	2	29.20	1	99.18	1	12.60	1 Ti?
73.95	2	30.26	1	3900.54	4	15.18	2
74.30	1	31.55	1	01.16	2 + d?	18.38	3
74.55	3	32.33	2	01.87	5	20.56	1
74.77	3	36.18	10	05.65	1 Si?	33.12	1 Ga?
76.10	1	40.44	10	06.28	1	35.26	1
76.16	1	41.41	5	07.78	1	36.61	1
76.40	3	41.80	1	11.95	2	38.00	2
77.13	5	42.40	1	18.85	2	38.80	1
80.37	2	43.77	3	19.09	1	42.09	4
80.74	1	44.95	1	21.00	2	42.95	1

0	3	4158.98	3	4293.10	1	4435.88	1 +
2	1	60.15	2	94.14	10	36.49	5
9	2	60.45	2 +	96.40	3	37.25	2
0	1	61.09	1	97.56	1	37.66	1
6	1 +	70.97	1	99.87	1	39.81	3
5	2	72.71	8	4300.44	1 +	45.83	2
9	1 +	73.40	15	05.43	1	47.52	5
5	1	74.77	1	09.04	3	50.20	1 +
8	1	75.78	10	11.57	10	51.90	1 +
7	2	82.64	2	12.30	1	54.9	1 + br
5	10	84.30	3	17.72	1	58.47	1
1	4	85.18	1	18.15	1 +	59.68	1
5	2 +	86.50	1	19.50	2	59.80	2
1	2	90.07	8	26.41	4	62.48	1
8	2	92.35	2	28.84	8	66.14	1
3	4	92.80	2	33.11	1	73.23	1 +
2	1	93.06	1	38.91	3	75.00	1 +
5	1	94.37	1	42.68	2	79.99	3
3	3	95.31	2	44.80	1 +	80.49	1 +
9	1 +	4201.59	4	45.76	1	84.93	4
3	1 +	02.25	5	51.70	3	88.77	2
9	10	04.76	2	53.60	1	90.40	1 +
6	1	05.40	2	54.64	2	92.40	1 +
9	3	12.06	30	55.93	1 +	93.03	1 +
6	3	14.06	4	56.63	1 +	95.43	1
0	3	15.33	3	58.16	2 +	4500.87	1
0	2	19.02	1	58.31	2 +	11.49	1
4	2	19.84	1	64.61	1	15.06	1
2	1	26.72	2	65.85	5	19.05	2
9	2	29.51	1	70.82	3	20.02	1
9	20	32.20	1	74.65	1	20.46	2
0	1 +	33.65	4	77.00	2	25.02	3
1	1 +	37.31	1	85.03	1 +	29.87	3
6	4	41.70	2	86.49	1	37.76	2
4	1	43.32	1 +	89.95	1 +	40.07	3
6	1	47.69	1 +	91.23	3	45.93	1 +
6	1	51.40	2	93.00	1	47.20	1 +
2	5	52.73	2	95.05	8	48.85	4
0	2	61.01	30	97.45	4	50.60	10
0	2	64.91	3	4400.75	2	51.48	5
6	30	69.53	2	02.91	3	55.8	1 + br
0	4	69.78	3	04.40	2	62.76	1
3	1	70.95	2	11.28	1	66.65	1
4	1	75.10	2 +	20.64	30	70.65	1 +
0	2	77.30	2	21.32	1	73.09	1
0	2	81.54	1	25.03	1	79.20	2
0	1	84.44	1	26.44	1	91.10	1
3	2	86.05	3	28.05	1 +	95.22	3
0	1	88.13	1	32.59	3	97.33	3

4598.02	1 +	4738.57	1 +	4878.69	1	5256.00	1 +
4605.68	1	44.09	2	95.45	1	65.37	1
08.43	1	52.36	1 +	99.41	2	98.95	1 +
16.94	4	55.34	1	4912.79	2	5376.94	1
28.79	1 +	60.95	1 +	21.97	1 +	5416.54	2
31.99	4	63.30	2	36.00	1	16.85	1 +
34.92	2	81.68	1 +	43.13	1	43.49	1
38.80	1	94.20	10	79.47	1	5523.73	5
42.00	2	4800.13	1 +	5032.02	1	84.64	2
57.41	1	14.00	1 +	39.33	1	5620.26	1
63.98	4	16.17	2	73.06	1 +	45.50	1 +
69.10	1 +	26.84	1	74.94	1 +	5722.15	4
74.17	1 +	28.64	1 +	79.26	1 +	81.01	1
82.46	1 +	38.33	1 +	86.03	1	5800.80	1
86.64	1 +	44.06	2	5103.66	2	58.00	2
92.23	2	49.35	1	10.99	1	5996.30	1 +
4706.10	1 +	52.03	1 +	49.91	2	6228.00	1 +
19.15	1 +	64.15	1 +	93.70	1 +	69.6	1 + br
32.97	1	65.80	3	5202.82	3	6402.47	1 +
38.23	1 +	67.35	1				

XLVIII. P. Phosphor.

Ältere Messungen: P. Geutes, Ztsch. für wiss. Phot. 5 (1907).

Material: Phosphorsäureanhydrid, auf Kohle.

Verunreinigungen: Keine.

Linienzahl: 15.

2534.12	3	2651.28	1	2754.72	1	3280.5	2 + br
35.74	5	51.69	1	2943.75	1	3409.90	1
53.37	4	91.46	1	3039.18	2	24.75	1
55.00	3	2709.73	1	3266.6	2 + br		

Kanten.

3246.30	K. V.	3270.58	K. V.	3296.53	K. R.	3321.19	K. R.
53.54	K. R.	81.30	K. R.	3303.09	K. R.	28.45	K. R.
55.37	K. V.	86.00	K. R.	12.03	K. R.	46.42	K. R.
69.05	K. R.						

XLIX. Pb. Blei.

Ältere Messungen: H. Kayser und C. Runge, Berl. Akad. (1893).

J. M. Eder und E. Valenta, Wiener Akad. 119 IIa (1910) (Rot).

Material: Metall von C. Schuchardt, auf Gaskohle.

Verunreinigungen: Tl.

Linienzahl: 46.

2237·55	3 u	2536·7	3 + u ³⁾	2873·48	50 u	3740·20	200
47·03	5 u	77·39	20 u	2927·0	1 + br	4019·80	50
2332·72	2 + ¹⁾	2613·77	10 u	3119·2	1 + br	58·00	1000 u
89·0	2 + ¹⁾	14·26	50 u	51	2 + br	62·31	20
93·92	30 u	28·50	8	3220·75	3 + r	4168·19	10
99·70	2 +	50·5	20 + br	40·35	2 + r	4340·70	1 +
2402·06	10 u ²⁾	57·18	2	62·5	2 + r	5005·63	10
11·86	8 u	63·27	20 u	3572·95	200 u ²⁾	5201·63	5
28·80	3 +	97·8	5 + br	3639·72	500 u	5422·9	1 + br
43·92	10 u ²⁾	2802·10	100 u	71·80	100 r	5609·0	1 + br
46·30	15 u ²⁾	23·31	30 u	83·62	1000 u	6002·3	1 + br
76·51	10 u	33·21	100 u				

L. Pd. Palladium.

Ältere Messungen: H. A. Rowland und R. R. Tatnall, *Astroph. Journ.* III (1896). H. Kayser, *Berl. Akad.* (1897). J. M. Eder und E. Valenta, *Wiener Akad.* 119 II a (1910) (Rot).

Material: Metall von Heraeus.

Verunreinigungen: Ag, Ba, Bi, Ca, Cd, Cu, Mn, Pb, Pt, Rh, Sn, Zn.

Linienzahl: 268.

2231·68	1	2362·40	2	2454·87	1	2551·95	2
51·60	1 +	68·05	2	57·35	3	61·14	1
54·40	1 +	72·24	2	57·81	2	64·2	1 + br
62·59	1	78·00	1 +	61	1 + br	65·60	3
64·40	1	88·42	1	69·34	2	69·65	2
80·92	1	2406·78	1	70·10	2	77·20	1
82·20	1	09·79	1 +	71·25	2	83·95	1
96·61	3	14·83	2	72·60	1	93·36	1
2302·14	1	18·82	2	76·50	8 u	96·09	1
16·56	1	20	2 + br	82·1	1 + br	2602·87	1
19·35	1 +	24·57	2	86·61	3	05·19	2
31·54	1	26·96	2	87·24	1	36·01	2
36·52	1	28·05	1 Au?	89·00	4	55·2	2 + br
36·66	2	31·02	2	96·78	1	58·84	2
37·84	1	33·20	2	98·87	3	76·06	2 Au?
47·62	1	35·41	2	2505·84	3	79·18	1
51·48	2	41·51	10 + br, u	13·2	1 + br	86·38	2
52·00	1	46·27	3 (Pb)	34·70	2	2734·04	2 ⁴⁾
57·70	1	46·81	1	50·76	1	42·48	2
60·58	1	48·00	8 u	51·10	1	63·19	15 u

¹⁾ Möglicherweise nur rote Komponente einer Umkehrung.

²⁾ Rote Komponente stärker.

³⁾ Die Linie ist 30 Å E breit.

⁴⁾ Kommt auch im Pt und Ir vor.

2806.55	1	3396.94	3	4323.20	1 + br, v	5234.99	5
07.8	1 +	3404.73	100 u	28.20	1 + br	56.37	2
24.51	1	06.20	1	44.82	3 + v	94.36	2
39.5	1 + br	19.83	3	51.17	2 + v	95.83	30
49.90	2	21.42	50 u	58.75	1 +	5312.79	3
54.68	2	33.59	20 u	60.40	1 +	45.31	2
75.85	1	41.54	20 u	79.75	1 +	62.84	3
2922.63	10	42.13	1	86.65	2	63.45	1 +
31.59	2	42.54	2	88.79	3	95.00	1 +
80.78	1 +	60.93	50 u	4406.72	4	95.47	20
3002.74	10	81.31	50 u	21.20	2	5406.80	1
03.10	1 + Fe?	88.31	1	43.21	3	27.88	1 +
07.37	1	89.93	15	73.76	15	35.33	2
09.88	3	3507.48	1	89.63	5	65.73	2
20.79	3	17.08	100 u	97.81	2	97.07	2
21.87	3	28.86	2	4516.37	5	5529.64	4
25.99	2 ¹⁾	53.24	50 u	41.29	5	43.04	20
28.05	20	66.77	3	53.14	3 r	47.28	10
28.86	2	71.29	20 u	90.21	2	48.55	1 +
32.30	1	96.81	2	4632.81	2	62.93	1 +
46.61	1	3609.71	100 u	77.61	4	5601.88	3
65.41	20	34.85	200 u	4708.26	1 +	03.23	1
66.20	2	46.14	1	24.20	3	08.26	3
75.28	3	54.57	1	62.05	1 +	19.63	5
3109.25	2	90.49	20 u	76.74	2	21.45	1 +
14.19	30	3719.06	15	88.36	15	42.90	3
22.91	1 Au?	99.31	10	91.07	1 +	55.65	3
39.54	1	3832.45	10	4817.20	2 +	59.09	1 +
42.97	10	94.33	20	17.69	15 r	68.70	1 +
3204.14	1	3958.79	20	19.34	1 +	70.28	20
19.08	3	92.4	1 + br, r	22.46	1 +	74.55	1 +
42.83	100 u	4007.6	1 + br	36.61	2	87.77	1 +
48.13	1	20.2	1 + br	75.59	15	90.30	3
51.89	30	21	1 + br	4920.03	3	95.30	15
59.01	30	87.52	10	24.35	1	5736.81	4
86.38	1 +	99	2 + br	30.17	1	37.84	1
87.38	10	4123.79	2	72.08	2	39.89	2
3300.00	1	70.02	5	5063.55	2	60.15	1 +
02.28	30 u	4213.11	20	5110.99	4	6130.80	2
07.17	1 + Cr?	41.8	1 + br	14.57	1	71.20	1
11.15	2	46.7	1 + br	17.18	5	76.41	1
13.10	2	49.2	1 + br	27.89	1	88.25	1
21.15	2	51.65	1	61.53	1	6508.72	1
73.21	30 u	68.42	3 + v	63.99	20	6774.81	3
80.89	8	82.05	1 +	5209.05	2	84.80	20
89.20	1	4315.12	2 + v				

1) Kommt auch im Pt und Ir vor

LI. Pr. Praseodym.

Messungen: M. Bertram, Diss. Bonn (1905). J. M. Eder und Valenta, Wiener Akad. 119 II a (1910) (Rot).

al: Praseodymnitrat von Dr. C. Auer von Welsbach, auf Gaskohle.

einigungen: Ad, Ce, Eu, Nd.

zahl: 2490.

7	1	3191.55	1	3302.00	1	3386.13	1 +
6	1	96.13	1	02.80	1 +	88.15	1
8	1	96.19	1	03.33	1 +	91.04	1
8	1	99.16	1	08.45	1	94.26	1
6	1	3204.94	1	09.24	1	94.75	2
8	1	05.15	1	12.49	1 +	3401.02	1 +
5	1	07.98	1	13.06	1 +	03.70	1
6	1	11.43	1 +	14.52	1	10.15	1
0	1	12.50	1	15.10	1	14.90	1
3	1	13.75	1	20.10	1	15.84	1
0	1	14.53	1	24.24	1	18.53	1
0	1	19.33	1	24.68	1	19.35	1
7	1	19.62	2	25.80	1	21.25	1
0	1	24.55	1	31.76	1	27.70	1
7	1	25.10	1 +	33.56	1	30.43	2
5	1	34.86	1	34.05	1	30.65	1
4	1	35.57	1	41.07	1	31.77	1
1	2	38.99	1	41.62	1	32.20	1
2	1	40.15	1	44.07	1	33.69	1 (Cr)
0	1	45.57	1	44.67	1	34.91	1
7	1	47.61	1	50.45	1	36.77	1
0	1	49.35	1	53.66	1 +	37.75	1
5	1	49.86	1	55.80	2	38.45	1 +
1	1	57.70	1 +	58.65	1	40.26	1
5	1	58.45	1 + br	59.41	1	42.92	1
6	1	59.08	1	60.30	1	47.84	1
5	1	64.45	1	61.08	1	47.95	1 +
5	1	64.76	1	63.40	1	48.32	1
4	1	68.34	1	64.11	1	49.96	1
4	1	73.03	1	65.03	1	51.60	1
6	1	74.70	1 +	66.07	1	54.60	1 +
5	2	76.76	1	70.40	1 +	56.10	1
5	1	78.94	1	72.66	1	58.90	1
2	1	79.12	1	72.95	1	60.75	1
6	2	82.41	1	75.76	1	61.20	1
9	1	83.25	1	76.79	1	62.01	1
9	1	85.98	1	77.57	1 +	62.22	1
5	2	88.78	1 +	79.91	1	62.50	1
0	1	95.67	1	82.81	1	65.91	1
6	1	96.52	1	83.50	1	66.86	1
6	1	3300.05	1 +	83.87	1	67.15	1

3467.99	1	3552.12	1 +	3646.45	3	3711.25	2 + d
68.19	1	52.80	1 +	48.44	1 +	12.51	1
68.78	1	53.96	1 +	49.55	1 +	13.44	1
69.44	1	55.35	1	50.30	1	14.20	2
70.18	1	57.83	1	51.21	1	15.75	1
72.50	1	62.26	1	52.54	1	16.35	1 d
74.00	2	62.69	1	54.48	1	17.97	1
74.57	1	63.89	1	54.78	1	18.17	1 d
79.40	1	64.32	1	55.27	1	19.56	1
79.65	1 +	69.69	1	56.46	1	21.66	1 +
81.18	1	70.70	1	57.58	1	23.75	1 +
82.37	1 +	71.95	1	57.79	1	25.19	1
83.66	1	75.06	1	58.40	1	26.45	1
83.96	1	77.59	2	58.48	1	29.23	1
84.47	1	84.15	1	59.20	1	29.55	1 +
84.95	1	84.38	2	60.25	1	30.71	1 +
86.65	1	89.64	1	60.55	2	31.63	1 +
87.16	1	96.34	1	61.60	1	33.05	1
87.70	2	99.06	1	61.80	2	33.18	1 d
88.35	1	99.65	1	62.55	1 +	34.53	3
89.15	1	3600.90	2	64.79	1 +	34.90	2
91.65	1	01.16	1	67.30	1	36.64	2
92.08	1	03.32	1 +	67.85	1	39.34	3
93.30	1	05.21	2	68.99	3	39.72	1
99.19	1	06.10	1 +	70.40	1 +	41.16	1
99.25	1	08.60	1	72.08	1	44.14	1
99.69	1	11.32	1 +	74.29	1	47.42	1
3503.20	1	12.10	2	75.06	1	47.61	1
03.58	1	12.87	1	76.05	1	48.19	1
04.41	2	13.85	1 + d	77.85	1	48.63	1
04.60	1 +	15.29	1	80.14	1	48.98	1
04.95	1 +	16.78	1	82.05	1 +	50.26	1 +
08.35	1	18.20	1	85.42	1	50.61	1 +
19.26	1	21.20	1 +	86.65	1 +	51.45	2
32.85	1	21.30	1 +	87.20	3	52.45	1 +
33.87	1	22.52	1	87.35	3	53.54	1 +
34.65	1	27.94	1	89.55	1	54.55	1
37.44	1	29.85	1	89.85	2	55.13	1
37.60	1 +	31.12	3	90.16	1	55.24	1
38.43	1	34.58	1 +	91.77	1 +	56.96	1
40.16	1	35.42	2	93.65	1 +	59.75	2
42.76	1	37.76	1	94.83	1	60.24	2
45.08	1 +	38.74	1	96.79	1	61.78	1
46.13	1 +	39.92	1	98.20	1	62.03	4
46.35	1 +	41.78	2	99.65	1	62.52	1
48.16	1	43.46	1	3701.96	1	62.70	1
49.65	1	44.65	1 +	03.48	1	63.18	1
50.15	1	45.70	2	06.92	2	63.73	1
50.50	1 d	45.81	3	10.52	1	64.23	1

3764.91	2	3817.78	2	3885.33	3 d	3926.13	1
65.11	1	18.00	2	88.21	1	26.73	1
66.14	1	18.41	4	88.44	1	27.58	3
66.63	1	18.86	1	89.46	2	27.87	1
69.05	2	19.27	1 +	89.54	2	28.43	1
69.79	1	20.95	1	90.13	1	29.05	1 +
70.59	1	21.95	2	90.34	1	29.44	2
72.20	1 +	22.67	1	91.88	1 +	30.03	1
72.66	1	22.95	1	92.69	1	30.75	1
72.91	1	23.32	2 +	95.20	1	31.10	1
72.99	1	23.72	1	97.00	1 +	32.30	1 +
74.18	1	24.20	1	97.20	1	33.13	2
74.69	1	28.86	1 +	97.41	2	33.45	1
76.18	1	29.50	1 +	97.87	1	34.38	1
77.74	1	30.88	4	99.00	2	34.99	1
78.85	1	31.54	1	99.81	1 +	35.98	3
79.56	1	32.45	1	3901.85	1	38.43	2
80.40	1	33.16	1	02.61	2 d	39.02	1
80.80	2	35.05	1	04.06	1	40.30	1 + d
82.05	1	38.43	2	04.97	1	40.55	1
82.46	1	41.15	3	06.24	1	42.41	1
84.00	1 +	42.49	2	07.45	1	42.48	1
84.09	1 +	44.69	2	08.21	4	44.76	1
85.57	1	45.10	1	08.59	10	45.05	1
86.10	1	46.71	3	09.75	1	45.59	1 +
87.00	2	47.06	1	11.46	1	45.78	1 +
88.17	1	50.99	4	11.97	1	47.10	2 +
89.85	1	51.72	5	12.15	1 d	47.80	8 r
90.74	1	52.94	3	12.41	1	48.75	1
92.60	3	53.60	2	12.75	1	49.62	8 r
93.10	1 +	56.03	1	13.05	4 r, d	50.79	1 +
93.55	1 +	58.40	1	13.69	2	51.98	1
94.50	1 +	59.29	1	14.90	1	52.17	1
95.10	1	62.20	1	14.98	1	52.26	1
98.07	1	64.20	1	15.59	1	52.48	1
99.51	1	64.70	1	16.58	1	53.32	1 +
99.85	1	65.57	2	16.90	1	53.63	8 r
3800.48	4	67.68	2	17.36	1 d	55.14	1
02.45	1	68.68	1	18.06	1 d	55.35	1
04.99	2	70.50	1	19.02	5 r	55.54	1
05.65	1	70.88	1	19.74	3 r	56.67	1
06.30	1 +	73.17	1 +	20.67	3 r	56.89	2
08.30	1 +	74.61	1	21.55	1	57.80	1
09.31	2	76.34	3	22.39	1	58.65	1
10.10	1	77.39	10	23.57	1	59.55	1
11.99	2	79.35	2	23.94	1	59.63	1
13.75	1	80.61	3	24.27	2	59.90	1
14.04	1	82.01	1	25.13	1	61.45	1 +
16.21	8	82.47	1	25.65	5	62.33	1

3962·60	3 r	3998·58	1	4041·52	1	4089·65	1 +
64·42	5 r	98·74	1	42·06	1	90·16	1 +
64·97	8 r	99·26	1	45·02	8	90·91	1
65·43	6 r	99·35	1	46·49	1	92·80	1 +
65·89	1	4000·35	4 d	46·82	2	93·01	1 +
66·71	4 r, d?	00·60	2	47·28	2	95·13	2 d
67·29	1	01·06	1 +	48·31	1	96·05	1 +
67·84	1	01·62	1	49·78	1	96·52	1 +
68·30	1	03·02	1	49·99	1	97·00	4 r
70·22	1	03·37	1	51·30	3	98·57	3
71·30	4	04·89	5	52·73	2	98·83	1
71·83	2	06·83	2	53·64	1 +	4100·38	2
72·31	5 r	07·94	1	54·10	1 +	00·91	20
73·28	1	08·90	15	55·02	10 r	03·37	1
74·09	1	09·40	1	56·29	1	04·05	1
74·50	1 +	10·13	1	56·70	10 r	04·64	1
75·03	1	10·86	2 r	58·35	1	05·03	1
75·12	1	12·45	1 Nd?	58·97	3 r	05·87	1
75·84	1	13·40	1 +	59·54	1	07·26	1 +
76·46	1	13·57	1	61·53	1	07·89	2 +
76·75	1	14·50	1	62·41	1	08·49	1
77·01	1	15·52	4	63·01	15 r	09·22	1
77·30	1	16·83	1	68·25	1	09·55	1
77·60	1	16·95	1	68·98	2	10·61	1
77·98	1	19·57	1	70·45	2	11·07	1
79·45	1 +	20·00	1	71·55	1	11·97	2 +
79·81	1 +	20·46	1 +	72·17	1	12·10	2 +
80·35	1 d	21·16	3	72·70	2	12·90	1 +
81·01	1	22·36	2	73·51	1	14·01	2 + d
81·33	1 +	22·89	3 r	74·10	1	14·45	1
82·22	8 r	25·35	1	74·52	1	14·96	1
82·68	1	25·69	3	74·84	1	15·95	1 d
83·75	1 d	26·96	2	75·05	1 +	18·70	20
84·42	1	28·85	1	75·49	1	19·50	1
85·79	1	29·16	2	76·36	1	19·95	1
86·31	1	29·87	1 +	77·54	1 +	21·10	1
86·69	1	30·14	1 +	78·13	1	22·45	1
87·30	1	31·25	1 +	78·30	1 +	23·13	1
87·50	1	31·93	5	79·98	5	24·21	1
89·28	1	32·66	2	81·19	6	24·50	2
89·86	10	33·13	1	81·75	1	25·20	2
92·06	2 +	34·01	6	82·10	8 r	26·30	1 +
92·32	2	34·48	2 +	82·98	1	29·30	4
94·18	1	36·20	1	83·52	4	30·93	5
94·99	10	37·36	1	84·90	1 +	31·97	1
95·99	2	38·35	2 +	85·28	1	32·40	2 (Fe)
96·84	1	38·61	4	86·40	1 +	33·79	3
97·22	5 d	39·07	1	86·90	1 +	37·35	1
98·10	2	39·50	4	87·37	2 +	37·66	1

4138·38	1 +	4187·94	1	4245·60	1	4281·00	1 +
40·48	1 +	89·70	20 r	46·30	1	81·21	1
41·42	10	90·79	1 +	47·79	10	82·00	1 +
42·15	1	91·80	5	49·21	1	82·62	8
42·58	1	92·65	1 +	49·63	1	83·90	2 + br
43·33	20	94·05	1	50·52	3	84·64	1
44·35	1	94·35	1	51·13	1	85·60	1
46·69	3	94·76	1	51·65	3 d	86·02	1
47·26	1	95·68	1 + br	52·24	1	86·31	1
48·60	4	96·10	1	52·60	1 +	86·55	1
49·45	1	96·95	1	53·26	2	87·10	1
50·20	2	4200·67	1	55·10	1	87·61	1
51·18	1 +	01·33	2 +	55·80	1	88·62	1
51·93	1 +	01·60	2 + br	56·26	1 +	89·00	1
52·50	1 +	02·55	1 +	56·45	1	89·57	1
53·64	1 +	03·68	1 +	56·97	1	90·05	2
54·20	2	04·74	1	57·82	1	90·61	2
56·65	3	05·85	1	58·10	1	91·16	2
57·90	1	06·88	20	59·65	1	91·85	2 +
59·61	1	07·93	1	59·80	1	93·31	2
59·94	1	08·42	4	61·20	1	93·79	3
60·63	1	11·94	1	61·90	2	94·87	2 d
64·33	10	12·05	1	62·42	2	95·30	2 +
65·37	1 +	13·43	1	62·93	2	96·03	1
65·65	1 +	13·73	2	63·28	2	96·35	1
66·52	1	14·12	1	63·90	3	96·70	1
68·11	2	15·30	1	65·13	1	97·91	8
69·59	3	15·69	1	65·61	1	98·70	1
71·99	6	16·20	1 + br	65·80	1	99·11	5
72·45	8	17·35	1	66·60	1	99·84	1 +
73·88	1	17·98	3	66·86	1	4301·35	1 +
74·79	1	19·80	2 + d	67·89	2	01·75	1
75·49	2	20·29	1	68·38	1	02·28	2
75·83	2	23·18	20	68·48	1	03·30	1
76·50	1	25·50	20 r	69·25	3	03·76	3 (Nd)
77·65	1	29·95	1	70·52	1	04·82	1
78·03	1	30·77	1 +	71·91	2	05·99	20
78·83	2 +	32·49	1	72·43	8	06·67	1
79·60	20 r	32·80	1	73·08	1	06·99	1
80·55	1	33·24	3	73·40	1	07·40	1
80·86	1 +	36·30	3	74·44	1 +	07·83	2
82·50	1	36·75	1	75·33	1	08·67	1
82·80	1	37·19	1	75·45	1	09·03	1
83·10	1	38·51	1	75·95	1	09·12	1
84·42	2	39·60	1	76·34	2	10·04	1
84·75	1	40·20	2	77·36	1 +	10·42	1 +
85·31	2	41·20	15	78·22	2	11·28	2
86·05	1 +	41·40	3 +	79·15	2	11·70	1
86·58	1 +	43·63	3	80·23	8	12·11	1

4312.55	1	4341.05	1	4366.88	1 +	4397.04	2
13.42	1 +	41.53	1	67.40	2 +	98.42	2
14.01	1 +	42.26	1	68.50	10	99.45	2
14.49	1	42.8	2 +	69.20	1	99.53	2
14.90	1	42.97	2	70.05	1	4400.18	2
15.68	2	44.05	1	70.98	2	00.41	2
16.26	2	44.41	5	71.40	1	01.00	1
17.21	2 +	44.59	4	71.79	4	02.32	1 +
17.99	2	45.05	1	72.55	1	02.74	1
18.60	1	45.65	1	72.88	1 +	03.45	2
19.17	2	46.39	1	73.10	1 +	03.78	3
19.88	1	47.05	1	73.98	2	05.30	2
20.33	2 +	47.62	5	74.58	3	06.00	10
20.55	1 +	48.31	1	75.89	1	06.79	2
20.96	1	49.32	1	76.77	1	08.30	1
21.50	1	49.87	1	77.77	1	09.00	15
22.20	1	50.56	3	78.00	1	09.85	1 +
22.56	1 +	51.13	1 +	78.40	1	10.37	1
22.95	1	52.00	4	78.77	1	10.72	1
23.27	1	52.25	2 +	78.99	1	11.01	1
23.71	3	52.68	1	79.51	2	11.50	1
24.10	1	52.91	1	80.50	3	11.96	1
24.50	1 +	53.34	1	81.25	1 +	12.34	3
25.51	1 +	53.73	1 +	81.78	1 +	12.94	1
27.66	1	53.95	1 +	82.57	3	13.42	1
27.86	1	55.08	3	82.96	3 +	13.92	5
28.10	1	55.38	1	84.25	3	14.55	2
28.38	1 +	55.94	1	85.00	2	15.75	1
28.57	2	56.40	1	85.45	1	16.13	1
29.15	2	56.85	1	85.62	1	16.73	1
29.58	3	57.65	2	86.39	1	17.36	1
30.60	2 d	59.19	2	86.80	1	18.04	1
31.10	1	59.37	2	87.61	1	18.34	1
31.45	1	59.92	3	87.85	1 +	18.60	1
31.63	1 +	60.70	1 +	88.85	1	19.21	3
32.25	1	61.41	2	89.66	1	19.80	4
32.65	1 +	61.73	1	90.29	1	20.20	1
33.30	2	61.96	2	91.27	1	20.48	1
34.17	10	62.33	1	91.68	2	21.40	4 d
34.80	2	63.15	3	92.16	1 d	22.26	1
35.00	1 +	63.40	2	92.62	1	23.45	1
35.90	4	64.15	1	92.88	1	24.11	1
36.10	1 +	64.28	1 +	93.22	1	24.35	1
37.69	1	64.66	1	93.67	1	24.76	3
38.43	1	64.95	1	94.21	1	25.40	1
38.85	4	65.10	1	94.91	1	25.69	1
39.60	1	65.50	1	95.16	3	26.03	1
39.86	2	65.95	1 +	95.93	3	26.50	1
40.42	1	66.25	1 +	96.24	4	26.67	1

1	4466.18	2	4494.50	2 +	4526.63	1
1 +	66.61	1	94.9	1 + br	28.22	1 +
1 +	68.36	1	96.60	20 d?	29.10	1
30	68.81	10	97.43	1	30.11	2
1	69.20	1	98.45	1 +	31.25	2 d
1	69.82	1	98.81	1	31.75	1
1 d	70.60	1 +	99.16	1 d	32.50	1
3	70.75	1 +	99.54	1	32.95	1
1	71.60	1 +	99.67	1	33.48	1
1	71.91	1 +	99.98	1 +	33.94	1
1 +	73.10	3	4500.26	1	34.32	10 d
1 +	73.55	1 +	00.69	1	35.04	1
1 +	73.67	1 +	01.40	1	35.40	1 +
1 +	74.00	2	01.54	1	36.09	5
3	74.63	1 +	02.00	2	37.31	1 +
1	75.00	1 +	02.45	1 +	37.55	1 +
1	75.55	1 +	03.03	1 +	38.19	1 +
1	75.89	1 +	03.44	1 +	39.37	1
1	77.35	3	03.93	1 +	39.50	1
2	77.46	3	04.77	2	40.31	1
1	78.14	1	05.28	1	41.25	1
2	78.73	1	06.06	1	41.44	2
3	79.26	1	07.15	2	42.70	3
1	79.77	2	07.97	1 +	43.70	2 + d
1	80.45	1	08.55	1	44.13	1
10	80.86	1	09.11	1	44.76	1 +
4 d	81.56	2	09.55	1	45.28	1
1	82.06	1 +	10.32	15	45.48	1
3	82.90	1	11.25	1	46.05	1 +
1 +	83.24	1	11.59	1	46.47	1 +
1	83.65	2	11.97	1	46.76	1 +
2	85.05	1	12.37	1	46.84	1 +
2	85.54	1	13.40	1	48.69	3
1 +	85.70	2	13.89	1	50.01	2
1	86.15	1	14.36	1	50.23	2
1	86.75	1	16.60	1	50.83	1 +
3 (Mn)	86.98	1	17.11	1	50.95	1 +
1 + br	87.21	1	17.74	10 d	51.07	1 +
1 +	87.98	2	18.25	1	51.35	1
2	88.33	3	18.83	1 +	51.70	1
1	88.75	1	19.29	1	52.40	2
1	90.55	1 +	19.79	2	52.99	1
1	91.30	1 +	20.55	1	53.44	1 +
1	91.65	1	20.93	2	53.66	1
1	92.60	3 + d	22.30	1	54.66	1
1	93.13	2	23.38	1	54.95	1
1	93.30	2 +	24.16	1	56.13	1 +
1	93.87	2	24.52	1	56.40	1
2	94.33	2 +	24.85	1	56.84	1

455710	1	4586.70	1 +	4622.41	1	4658.26	2
5759	1	87.16	1 +	22.90	1	58.55	1
58.03	1	87.25	1 +	23.35	1	58.90	2
58.65	1	88.15	1	23.82	1 +	59.66	1
59.11	1	89.30	1	24.20	1	59.90	1
59.30	1	89.90	1 +	25.45	1	60.03	1
59.65	1	90.32	1	25.75	1 + br	60.34	1
59.85	1	90.90	1	27.19	2	61.08	2
61.14	1 +	91.11	1	28.92	10 d	62.92	1
61.26	1 +	91.73	1 +	29.65	1 +	63.33	1
61.63	1	92.11	1	29.85	1 +	63.89	1
61.95	1	92.33	2	30.90	1	64.81	3
63.31	5	93.75	1	31.85	1	66.13	1
63.95	1	94.74	1	32.43	3	66.35	1
64.10	1	95.12	1	33.10	1	66.66	1
64.52	1	96.00	2 +	33.63	1 +	68.40	1 +
65.00	2 d	97.12	3	34.20	1 +	68.60	1 +
66.10	1	97.83	1	34.90	1 +	70.72	2
66.62	1	98.91	1	35.24	1	72.26	5
67.02	1	99.10	2	35.86	3	72.77	1 +
67.67	1	99.63	1 +	36.41	1	74.40	1 +
68.71	2	4600.53	2	36.90	1	74.96	2
69.80	1	01.24	1 +	39.15	1 +	75.23	1
70.28	2 +	02.71	1	39.70	3	75.65	1
70.57	1	03.65	1	40.06	1	76.35	1
70.70	2	03.97	2	40.39	2	76.90	1
71.77	2	04.37	1	42.20	1 +	77.16	1
72.29	2	04.66	1	43.68	3 d	77.96	1
73.02	1	05.16	1	45.29	1 +	78.32	2
73.46	1	05.40	1	45.66	1 +	79.22	2
74.38	1 +	06.60	2	46.24	3	79.67	1
74.81	1	07.11	1	47.16	2	80.01	1
75.06	1	08.16	1	48.12	1 +	80.50	1
76.48	3	09.3	1 + br	48.73	1	80.67	1
76.80	1	09.8	1 + br	49.28	1 +	82.25	1
77.15	1	10.37	1	49.66	1	82.40	1
77.69	1	10.8	1 + br	50.04	1	82.64	1
78.30	3 d	12.23	3	50.30	1	83.45	1 +
78.87	1	12.73	1	50.65	1	83.63	1 +
80.02	1	13.96	1	51.12	1	84.02	1
80.33	1	15.11	1	51.68	4	84.70	1
80.66	1	15.52	1	52.86	1	85.10	3 d
80.99	1 +	17.26	1	53.80	1	85.60	1
81.73	2 + br	17.76	1	53.97	1	86.44	1
82.75	1 +	17.87	1	54.21	1	87.40	1
83.85	1	18.16	1	56.15	1	87.99	3
84.60	1	18.40	1	56.95	1	88.68	1
86.10	1	19.83	1	57.40	1 +	89.20	1
86.30	1	21.50	1	57.78	1 +	89.52	1

2	4724.61	1	4761.16	1 +	4798.50	1
1	24.96	1	61.30	1 +	98.93	1
1	25.06	1	62.15	1	99.59	1
1 +	26.37	1 +	62.60	1	4800.12	2
2	26.52	1 +	62.92	3	01.28	3
1	26.68	1 +	63.75	1	01.68	1
1	28.81	3	64.63	1	02.21	1
5	29.30	1	65.41	3	02.90	1
1	30.90	3	66.10	1 +	04.1	1 + br
1 +	32.37	1 +	66.55	1 +	06.05	1 +
1	33.10	1 +	67.09	2	06.80	1 +
1	33.95	1	67.99	2	07.42	1
1	34.35	3 d	69.78	1	07.60	1 +
1	36.90	4	70.11	1	08.35	2
1	38.79	1	70.65	1	11.23	1 +
1	39.49	1	72.05	1 +	11.92	1 +
1 +	40.06	1 +	72.49	1	14.51	3
1 +	41.20	1 +	72.71	1	15.81	1
1 +	41.70	2	73.70	1	16.30	1
1 +	42.51	1	74.72	1	17.71	1
1 +	43.25	1	75.35	1	18.50	1
1 + br	43.75	1	75.60	1	19.22	1
1 +	44.36	3	76.18	1	19.90	1
1 +	45.11	3	78.35	1 +	20.29	1 +
3	46.67	1	78.47	1 +	20.79	1 +
3	47.12	3	79.38	2	21.33	1
3	47.76	1 +	80.22	1	22.13	2
3	48.36	1	82.29	1	23.16	3
1 +	48.78	1	83.05	1	24.84	1 +
1	49.91	1	83.54	4	25.65	1
1 +	50.75	1	84.80	1 +	26.00	1
3	51.50	1	85.80	1 +	26.48	1
3	51.86	1	86.78	1	26.9	1 + br
1	53.03	1	87.40	1	27.42	2
1	53.70	1 +	87.75	1	28.23	2
1	54.10	1	88.45	1	29.65	1 +
1 +	54.64	1 +	89.55	1 +	30.40	1 +
1	54.81	1 +	91.03	1	31.62	1
1 +	55.53	1	91.45	1	32.27	3
1	56.15	2	91.80	1	32.90	1 +
1	56.31	2 +	92.16	1	33.4	1 + br
1	57.29	1 +	93.10	1 +	33.9	1 + br
1	58.11	2	94.50	1 +	34.9	1 + br
1	58.23	2 +	95.08	1	35.62	1 +
1	58.7	1 + br	95.45	2	36.14	1 +
1	59.12	1 +	96.00	1 +	37.20	3
1 +	59.40	1 +	96.60	1 +	38.8	1 + br
1	60.09	1	97.02	1 +	39.5	1 + br
1	60.88	1	98.15	1	39.70	2

4840.90	2+	4890.45	2	4951.52	3	5045.69	3
41.73	1	92.25	1+	56.19	1+	52.70	1
42.02	1+	92.75	1+	56.75	1	53.58	3
42.75	1	93.08	1+	56.87	1	58.50	1+
44.35	1+-br	95.10	1+	60.44	2	59.50	1+
45.35	1+	96.30	2	61.23	1+	60.60	1+
45.80	1+	97.45	1	64.35	1	61.10	1+
46.15	1	98.06	1	64.74	1	61.70	1+
46.57	1	99.62	1	65.6	1+-br	63.57	1
48.70	3 d	4900.10	1	68.05	1	65.02	1+
50.46	1	01.67	2	68.52	1+	67.60	1+
50.85	1	03.56	1+	71.14	1	70.19	1
51.65	1	04.61	1	71.73	1+	73.80	1+
53.87	2	07.15	3	72.65	1	75.85	2
55.50	1	07.95	1+	75.08	2	76.50	1
56.25	1	11.65	1	75.90	2	76.86	1
57.54	2	12.80	2	76.54	2	84.62	1
58.75	2	13.30	1	77.70	1+	85.48	1
59.18	2 d	14.20	3	78.51	1	87.29	2
60.12	1+	14.60	1	79.26	1	88.20	1+
62.18	1	14.89	1	80.70	1+	91.81	1
62.50	1	15.59	1	82.18	1+	93.31	1
62.90	1	16.54	1+	87.90	1	95.97	1
63.30	1	17.16	1	89.43	2	96.52	1
64.05	1+	19.76	1	91.99	1	5104.22	1+-d
65.40	2	21.93	1	92.50	1	10.56	4
66.25	1+-br	22.6	1+-br	95.8	1+-br	10.94	4
67.57	1	24.76	3	97.60	1+	17.45	1
68.41	1	24.97	1	5000.79	1+	18.20	1
69.51	1	25.49	1	02.61	2	20.73	1
70.28	1	25.78	2	02.90	1+	21.9	1
70.56	1	27.23	1	04.76	1	29.70	4
71.01	1	28.58	1	05.71	1+	33.59	3
73.1	1+-br	29.55	1	07.78	1+	35.29	4
73.8	1+-br	31.47	1+	09.59	1	39.99	1
75.05	1+	32.37	1+	10.20	1	47.63	1
75.22	1+	32.96	1	13.40	1	50.04	1
76.44	2	35.32	1	15.73	1	51.51	1
77.99	3 d	35.55	1	18.73	2	52.41	2
79.30	1+-d	36.15	2	19.90	3	52.53	1
79.70	1+-	38.56	1	22.68	1+	53.40	1
81.15	1+	39.07	1+	27.11	3	54.66	1
82.40	2	39.90	3	29.16	1	56.56	2
83.40	1+	40.48	3	32.16	1	59.38	1+
84.49	1+	42.50	1+	33.55	2	61.91	3
84.63	1	43.90	1	34.55	3	68.49	1
86.20	2	47.36	1	37.61	2+	74.10	5
87.15	1+	48.34	1	44.00	2	74.95	1
89.83	1+	50.81	1+				

5175.42	2	5290.11	1 +	5390.31	1	5458.29	1
76.00	1 +	92.10	3	91.01	1	59.20	1 +
77.54	1	92.29	3	91.47	1	60.49	2
84.04	2	92.80	3	93.19	1 +	62.61	1
88.39	1	96.10	1	94.28	1	65.50	1 +
91.52	4	96.88	1 +	96.09	1	68.00	1 +
94.61	2	97.73	1	5401.17	1	69.48	1 +
95.31	4	98.25	4	01.63	1 +	69.90	1
95.49	4	5300.30	1 +	02.80	1	70.11	2
95.65	1 +	01.95	1	03.30	1 +	70.78	1 +
96.26	1 +	04.30	1 +	05.03	1	71.45	1 +
5203.00	1 +	06.05	1 +	08.20	1 +	72.00	1 +
06.73	3	07.92	1 +	09.29	1	72.12	1 +
08.08	2	09.14	1	10.75	2 +	73.7	1 + br
12.10	1 +	10.10	1 +	11.79	3	75.81	2
12.67	1 +	11.29	2	15.40	2	77.57	1
14.54	1 +	12.50	2 d	13.62	2	77.90	1 +
15.6	1 + br	13.55	1	17.51	1	78.68	1 +
16.91	1	13.90	1 +	17.80	1	79.95	2
19.23	4	14.90	1 +	19.05	1	81.96	1
20.29	5	16.80	1	19.28	1 +	82.3	1 + br
21.50	1	21.23	2	19.91	1	83.25	1 +
23.44	1	22.01	1	21.20	1 +	85.70	1
28.16	2	22.95	5	22.69	2	86.08	1
30.43	1 +	31.66	2	23.34	1	86.82	1
36.7	1 + br	35.0	1 + br	26.59	1	87.33	1
42.8	1 + br	36.7	1 + br	27.50	1	87.65	2
43.85	1	40.39	1 +	28.21	1	87.77	1 +
46.20	1 +	41.11	1 +	29.00	1 +	89.14	1
50.00	1	41.8	1 + br	30.50	1 +	90.80	1
51.81	1	42.1	1 + br	31.39	1	91.04	1 +
51.95	1 +	42.74	1	32.33	2	91.89	1 +
54.65	1 +	44.07	2	32.85	1	92.59	2
55.92	1 +	49.00	1 +	33.86	1	92.88	1
56.8	1 + br	52.60	3	35.36	1 +	94.00	1 +
58.40	1 +	54.52	1	37.60	1	94.73	1 +
58.95	1 +	59.20	1	40.56	1	96.10	1 +
59.85	3	62.57	1 +	41.72	1 +	96.44	1 +
60.00	2 +	63.67	1 +	42.03	1 +	97.48	1 +
64.00	3	69.0	1 + br	45.64	1 +	98.55	1 +
67.79	1	72.59	1	48.65	1	5501.72	1
69.20	1 +	74.45	1	49.30	1	02.40	1
72.90	1 +	77.65	1	51.00	1 +	03.10	1 +
77.40	1 +	78.20	1 +	51.42	1 +	04.94	1
88.77	1	81.50	4	52.10	1 +	07.34	1
85.77	2	81.91	1	52.53	1 +	09.01	2
86.80	1 +	86.30	1	53.46	1	09.35	3
88.20	1 +	88.22	1 +	53.92	1 +	10.23	1 +
89.46	1	89.02	1 +	57.27	1 +	11.88	2 +

5513.82	3	5575.65	1	5643.4	1 + br	5718.05	1 +
14.76	1	76.57	1 +	43.6	1 + br	19.30	2
15.32	2	79.01	1	45.61	1	19.87	1
16.45	1	80.61	1	47.85	1	20.01	1
17.90	1 +	80.87	1	48.25	1 +	22.85	1
19.60	1	82.31	1	48.96	1 +	28.55	1
20.55	2 +	82.60	1	50.85	1	30.76	1 +
22.2	2 + br	84.25	1	51.97	1 +	32.09	2
23.01	2	88.19	1 +	53.29	1 +	39.1	1 + br
24.35	2 +	88.45	1	54.45	2	42.6	1 + br
26.10	2 +	88.71	1	56.89	1 +	45.15	1
26.76	1 +	89.70	1 +	58.76	1 +	45.7	1 + br
28.1	1 + br	90.70	1 +	60.08	2	47.30	1
28.70	1 +	91.40	1 +	61.80	2 +	48.1	1 + br, d
29.05	1 +	91.70	1 +	62.40	1	53.25	1 +
29.56	1 +	91.99	1	65.50	1 +	55.75	1 +
30.41	1	93.44	1	65.77	1 +	56.38	2
31.39	2	94.36	1 +	67.80	1 +	57.75	1
32.46	1 +	95.13	2	68.69	2 d	59.61	1
32.90	1 +	97.51	2	69.75	2	60.41	1
35.39	3	5600.46	1 +	70.21	2	61.47	1 +
37.43	1 +	01.53	1	72.09	1 +	69.40	1 +
38.58	2	05.24	1	73.19	1 +	70.00	1 +
38.95	2	05.84	3	74.33	1	73.39	1
39.95	1 +	06.90	1	75.56	1 +	75.83	1 +
40.90	1 +	08.1	1 + br	77.25	1	76.13	1 +
41.50	1 +	09.12	2	78.40	1	77.50	1 +
44.06	1	10.41	2	81.36	1	79.48	2
45.20	2	12.1	1 + br	82.10	2	85.58	2 +
45.5	1 + br	12.3	1 + br	83.90	1 +	86.42	2
48.50	2	13.25	1	84.21	1	91.65	1
49.97	1 +	17.2	1 + br	85.82	1	5801.1	1 + br
51.30	1 +	17.7	1 + br	86.70	1 +	07.79	1 +
52.09	1 +	17.9	1 + br	87.40	1 +	10.82	1
53.61	1	20.29	2	88.65	2	13.80	1 +
56.03	1 +	20.49	2	89.40	1	15.43	3
57.43	1 +	22.09	3 d	91.20	2	15.59	2
57.60	1 +	23.26	4	93.09	1 +	18.83	2
58.62	1	24.65	3	95.69	1 +	20.88	1
60.40	1	25.92	1 +	96.15	1	22.87	1
61.68	2	27.90	1 +	98.20	1 +	23.94	2 d?
62.23	2 +	32.02	1 +	5702.48	1 +	29.1	1 + br
64.47	1 +	33.25	1 +	04.64	1 +	31.19	1
65.73	1 +	35.15	1 +	07.83	2 d	35.35	1
67.10	2	36.1	1 + br	08.50	1	44.85	1 +
70.50	1 +	36.67	2	11.87	2	45.22	1
71.27	1 +	37.56	1	14.05	1	47.30	1
72.03	3	38.98	3 d	15.60	1	50.90	1
74.85	1	40.55	1	16.30	1	52.88	1

1	5996.3	1 + br	6210.78	1 +	6415.7	1 + br
1	6002.70	1	12.92	1 +	29.87	2
2	06.59	2	18.30	1 +	32.06	2
2	16.70	2	21.9	1 + br	53.65	1 +
1	18.01	3	37.06	1	55.10	1 +
1 +	25.95	3	44.60	2	62.9	1 + br
2	43.12	1	53.45	1 +	68.0	1 + br
1 + br	46.89	2	55.31	2	75.5	1 + br
2	49.52	1 +	62.82	2	78.2	1 + br
1 +	50.31	1	64.81	1 +	86.80	2
1	55.36	3	74.95	1 +	92.02	2
2	67.51	1	75.1	1 + br	97.4	1 + br
1	86.10	1	78.92	2	99.20	1 +
1 +	86.40	1	81.57	3	6500.99	1 +
1 +	87.72	2	88.25	1 +	04.37	1 +
1	90.60	1	6302.65	1	17.4	1 + br
1	93.29	1	04.30	1	19.08	1 +
1 +	96.55	1	05.52	2	40.7	1 + br
1	6106.97	1	22.57	1 + br	64.89	2
3	09.27	1 +	27.28	1 +	66.99	2
1	14.61	2	41.14	1 +	6610.17	1 +
1	22.45	1 +	44.15	1 +	16.91	2
1 +	41.75	1	47.38	2	18.63	1
2	48.46	1	51.20	1 +	31.3	1 + br
1	58.02	1 +	57.42	1 +	32.20	1 +
2	59.35	1	59.30	2	47.38	1
1 +	61.41	3	63.93	1	57.05	3
1 +	62.39	1	76.51	1 +	73.69	3
1 +	65.51	1 +	78.85	1 +	74.05	3
2	66.16	3	89.86	1 +	87.8	1 + br
1 +	82.57	2	92.3	1 + br	91.5	1 + br
1 +	87.76	1 +	93.41	2	6737.10	1 +
1 +	97.67	1	97.98	1	47.4	1 + br
2	6201.00	1	98.26	2	49.5	1 + br
1	04.39	1	6411.51	2	98.9	1 + br
1 +	05.86	1	13.97	2	6827.8	1 + br
1 +						

LII. Pt. Platin.

Lessungen: H. A. Rowland und R. R. Tatnall, Astroph. Journ. II
5). H. Kayser, Berl. Akad. (1897). J. M. Eder und E. Valenta,
er Akad. 119 IIa. (1910) (Rot).

1: Metall von Heraus.

Einigungen: Ag, Au, Cu, Ir, Pd, Rh, Ru, Sn.

zahl: 461.

Ultraviolet zwischen λ 3500—3856 auf Cu aufgenommen, sonst
hle; im Sichtbaren zwei Pt-Elektroden.

2201-10	1	2401-09	2	2616-83	1	2808-60	2
02-30	1	01-96	2	19-66	3	13-09	1
17-40	1	03-18	3	27-48	2	18-35	4
22-71	1	13-15	1	28-12	8	18-74	1
34-98	1	18-14	3	39-43	4	24-50	8 (Cu)
45-15	1	24-96	1	45-46	2	30-40	20
45-58	2	26-53	1	46-98	10	33-50	1
49-35	1	28-10	3	50-98	8	34-83	4
49-98	1	28-28	3	58-27	3	37-35	1
57-18	1	29-17	2	58-80	2	49-22	1
68-91	2	36-77	3	59-60	30 u	53-19	3
74-16	1	40-16	4	74-65	4	53-50	1
74-47	2	50-53	1	77-23	5	70-59	2
74-92	1	51-07	3	98-51	5	88-32	3
76-49	1	67-52	6	2702-50	20	90-51	1
76-94	1	71-10	2	05-99	20	93-38	4
80-60	1	75-22	1 Ir?	13-20	4	94-02	10
88-27	2	83-45	2	15-85	1	98-01	8
89-37	2	87-25	5	19-12	15	2906-02	6
92-47	2	88-81	2	24-46	1	08-01	2
95-81	2	90-23	3	30-01	4	10-57	1
98-45	1	95-91	3	33-78	2	12-42	8
98-86	1	98-59	3	34-07	5 ¹⁾	12-90	1
2303-26	3	2504-15	2	34-58	3	13-39	2
05-75	1	06-03	3	37-38	2 ²⁾	13-69	8
08-16	2	08-59	3	37-64	1	19-47	6
11-05	2	14-00	1	38-56	3	21-52	5
15-60	2	14-17	2	44-94	1	28-21	2
18-40	2	15-13	3	47-70	4	29-90	20
26-20	2	15-68	4	53-96	4	30-90	2
31-06	1	17-26	1	55-01	5	38-91	2
40-27	3	24-41	3	57-80	1	42-88	4
43-52	3	29-50	2	58-30	1	44-89	4
46-85	1	36-06	1	66-77	1	59-22	3
47-24	1	36-57	1	69-95	3	60-90	3
56-40	2	39-31	3	71-80	5	78-17	1
57-17	3	41-45	1	72-95	2	83-87	2
57-65	2	49-56	2	73-39	4	89-93	1
68-35	3	52-33	3	73-75	2	94-20	1 r
77-36	2	72-72	1	74-10	3	98-07	30
78-05	2	74-58	1	74-30	1	3001-27	1
80-05	1	87-89	1	74-90	1	02-39	10
83-74	3	96-10	3	93-39	3	03-40	1
86-90	2	2600-00	1	93-74	1	04-28	1
89-61	2	03-23	4	94-31	2	05-91	2
96-25	2	14-70	1	2803-34	6	11-70	2 +

1) Kommt auch im Ir und Pd vor.

2) Kommt auch im Ir vor.

1	3256.08	10	3514.85	2	3996.75	3
1	56.63	1 -+	28.69	2	4002.66	1 +
5	59.29	1	31.04	1	54.94	2
2	59.87	4	46.60	2 +	66.10	2
2	61.23	2	61.90	1 +	81.64	3
3 ¹⁾	61.82	3	87.54	2	92.50	5
1	63.75	1 +	89.33	2 ¹⁾	4118.84	10
10	68.53	8	94.16	2	64.70	5
2	82.10	5	3610.95	2	92.59	4
20	83.40	4 d	11.07	1	4201.30	1
1	90.35	6	21.83	1	47.85	1
2	98.22	1 +	24.90	1	51.32	1
4	3300.10	1	28.27	10	60.13	1
4 (Cu)	02.00	10	29.00	2	63.69	2
50	02.25	5 Pd?	38.94	8	69.41	1
2	11.97	2	43.32	5	74.03	2
5	12.63	2	52.42	1 +	81.94	1 +
2	15.18	8	54.15	1	88.25	3
3	23.95	8	59.54	3	91.14	2
1	25.86	2	63.25	3	4305.68	1
3	32.33	1	68.55	1	09.35	1
4	35.94	2	72.16	6	27.24	5
4 Pd?	38.30	1	74.21	5	34.87	2
2	44.05	4	83.18	3	43.87	1 +
10	67.15	5	87.61	4	58.53	3
3	73.17	6 Pd?	3700.05	4	64.63	3
10	80.83	6	06.70	3	84.87	1
1	3406.70	2	20.90	2	91.97	5
1	08.27	15	3800.02	2	4411.60	3
2	08.77	1	00.36	2	14.45	1
1	14.61	1	00.63	3	30.41	3
1	17.20	2	18.85	3	37.48	4
1	21.87	1	20.04	4	42.75	15
1	26.87	2	91.92	3	43.36	1
1	28.09	5	98.90	3	45.73	4
10	32.00	2	3900.88	5	55.17	2
10	48.50	1 +	03.85	2	57.23	1
3	54.29	2	04.54	2	58.82	3
1	64.10	2	06.43	1	65.30	1
2	64.59	5	11.06	2	73.62	2
2	76.92	2	23.13	10	80.50	1 +
6	83.58	5	25.50	3	81.81	2
4	85.43	10	48.54	4	84.89	10 r
4 ²⁾	91.15	2	53.79	1	86.90	2 +
3	3500.45	2 +	66.51	8	88.36	1
5	05.84	1	66.69	2	89.52	1 +

ent auch im Ir und Pd vor.

ent auch im Ir vor.

4493.33	3	4684.25	3	5095.94	1	56399.27	
98.93	20-+	4722.35	1	5117.67	1	5762.90	
4508.75	1	37.74	3	18.62	1	63.80	
11.42	3	39.97	2	94.10	1	58.40.35	
14.30	2	48.07	2	5209.10	1	45.05	
15.83	1+	72.51	2	27.82	4	61.10	
21.10	15.+-	4810.67	1	57.70	1	5964.78	
23.20	10-+	31.37	1	61.03	1	6026.28	
45.85	1	32.16	1	86.39	1	77.20	
48.03	5	54.09	3	5301.20	8	6172.80	
52.11	2	62.60	2	19.54	1	6216.76	
52.61	10	79.70	4	69.16	3	83.79	
54.76	4	4980.57	1	88.10	2	6318.67	
60.26	4	87.02	1	90.99	4	26.87	
76.45	1	98.15	1	5469.70	1	6490.78	
77.59	2	5002.84	1	75.98	8	6523.78	
80.70	2	33.73	1	78.71	8	6648.71	
80.81	2	38.75	1-+	5514.34	2	6710.70	
4641.02	4	44.20	2	26.09	2	60.40	
50.20	1+	59.70	5	60.28	1	7258.02	
58.17	5						

LIII. Ra. Radium.

Ältere Messungen: Fehlen.

Material: Radium-Baryumchlorid (70% Ra) auf Gaskohle.

Verunreinigungen: Keine.

Linienzahl: 50.

2709.04	2	4436.50	5	5041.74	2	5556.40
2813.85	2	44.70	1-+	81.26	2	5616.90
3649.75	3	4533.35	10	97.76	3	61.06
3814.61	50	4641.48	5	5206.47	1	5813.96
3907.53	1	82.41	100	06.47	1	5365.74
16.7	1-+	99.47	5	64.5	1	6167.30
4010.50	2	4702.13	1-+	83.49	1	6200.55
54.2	1-+ Gy?	40.40	1-+	5320.50	1	6337.47
4265.27	1	4826.10	30 n	5400.46	2	6446.47
4305.25	3	56.32	5	07.03	2	87.60
40.81	20	4903.46	3-+	5502.22	1	6641.38
66.50	1	71.98	2	53.9	1-+	42.73
4426.45	1-+	82.20	2			

LIV. Rb. Rubidium.

Messungen: H. Kayser und C. Runge, Berl. Akad. (1890).

Lehmann, Ann. d. Ph. 5 (1901) (Ultrarot). J. M. Eder und Valenta, Wiener Akad. 119 IIa. (1910) (Rot).

1: Rubidiumchlorid von E. Merck, auf Gaskohle.

Unreinigungen: Ca, Cs, K, Na, Sr.

Zahl: 19.

2 + u ¹)	4215·75	200 u ¹)	5579·2	1 + br, r	6071·2	2 + br, r
2 + - u ¹)	5261	1 - + br, r	5648·2	3 + br, r	6160·2	3 + - br, r
20 u ¹)	5363·1	2 - + br, r	54·3	2 + - br, r	6206·70	10 + br, r
10 u ¹)	91·4	1 - + br, r	5724·6	3 + br, r	98·8	20 + br, r
500 u	5431·9	2 - + br, r	5858·0	1 + br		

LV. Rh. Rhodium.

Messungen: H. A. Rowland und R. R. Tatnall, Astroph. Journ. III (1895). H. Kayser, Berl. Akad. (1897). J. M. Eder und E. Valenta, Wiener Akad. 119 IIa. (1910) (Rot).

1: Im Ultraviolett, Metall von Heräus, im Sichtbaren Rhodiumchlorid, auf Gaskohle.

Unreinigungen: Cu, Ir, Pd, Pt.

Zahl: 1002.

Wellen λ 3453 - 4349 auf Kupfer gemessen, sonst auf Gaskohle.

9	1	2359·26	1	2409·62	1	2444·35	3
	1	61·25	1	10·35	1	45·70	2
	1	62·01	1	12·61	1	48·36	1
	1	64·74	1	15·93	2	48·92	2
	1	66·97	1	18·71	2	49·15	2
	1	68·38	3	19·79	2	50·67	2
	1	68·94	1 + -	20·26	1	55·79	1
	1	69·66	1	21·05	2	56·26	1
	1	70·67	1	24·02	2	59·00	2
	1	79·02	1	24·51	1	61·14	2
	1	83·00	2	27·20	2	62·74	1
	1	83·50	2	27·77	1	63·70	2 +
	1	84·76	2	29·05	1 + -	69·20	1
	1	86·23	3	29·60	2	70·50	1
2	96·61	1	31·94	1	71·56	1	
1	99·05	1	32·03	1	72·56	1	
2	2407·97	1	32·75	1	73·00	1	
1	08·06	1	37·16	1	73·20	1	
1	08·26	1	40·45	2	74·12	1	

Die Komponente stärker.

2474·67	1	2534·18	2	2607·83	1	2687·01	2
75·11	3	36·80	2	08·64	1	87·40	1
75·72	1	37·16	3	09·26	1	88·18	1
77·61	2	37·72	1	18·19	1	89·71	1
79·85	2	37·80	1	18·70	3	93·73	1
80·60	1	39·88	4	15·74	1	94·40	3
80·94	1	41·11	2	16·17	1	97·95	1
82·15	2	43·63	1	18·61	2	2700·39	1
83·41	2	44·30	2	21·12	2	00·69	1
85·67	1	45·44	1	22·70	3	02·17	1
87·60	3	45·79	4	24·96	1	02·33	1
88·24	1	47·75	1	25·33	1	03·84	3
88·54	1+	48·67	2	25·51	2	05·05	1
89·98	1	51·30	1	26·00	3	05·73	3
90·85	3	53·42	5+	26·77	2	07·32	2
91·93	1	55·00	1	28·22	1	09·60	1
92·39	2	55·45	3	30·00	1	14·50	2
93·73	1	56·98	1	30·49	3	15·14	1
94·61	3	58·76	3	33·40	2	15·40	2
99·10	1+	60·02	1	33·50	2	16·89	2
99·81	1	60·33	1	35·07	2	17·56	2
2500·67	1	62·75	1+	35·40	1	18·63	2
00·74	1	65·86	2	38·39	1	20·23	2
01·10	1	66·13	2	38·84	2	20·60	2
02·55	2	66·95	2	43·10	2	22·23	1
03·95	1	67·37	3	43·68	1	29·00	3
04·39	3	69·16	1	47·07	1	34·89	1
05·20	2	70·20	2	47·38	2	36·84	2
05·76	1	73·60	1+	48·67	1	37·47	2
07·35	1+	74·33	2+	49·69	1	37·67	1
08·73	1+	74·75	2	52·00	1	38·34	1
09·81	2	75·85	2	52·76	3	38·80	1
10·75	2	76·32	1	56·00	1	40·00	1
10·88	1	79·49	1	59·13	2	40·30	1
11·15	2	79·64	1	63·77	1	40·63	1
12·19	1	81·14	1	66·51	1	41·85	2
13·50	3	81·80	1	71·15	2	43·55	1
14·82	1+	86·90	1	74·05	1	49·38	1
15·84	2	87·25	2	74·29	1	51·47	1
20·66	2	88·55	1+	74·52	2	52·95	1
22·98	2	90·91	1	76·18	2	00·55	1
24·36	1	92·26	1	76·55	1	62·94	1
25·21	1	97·03	1	80·37	1	64·92	1
26·10	1+	97·16	1	80·72	2	66·64	1
26·25	1	97·80	1	81·87	2	67·83	2
27·14	1	98·20	2	82·64	1	68·33	2
31·85	1	2603·51	2	83·66	1	71·63	2
32·79	2	05·80	1	84·30	1	74·56	1
33·70	1	06·55	2	86·60	2	75·86	1

2	2870.10	1	2981.25	1	3093.58	1
1	70.54	1	82.51	1	94.69	1
2	71.49	4	83.20	2	97.06	2 +
2	73.75	2	86.32	4	3102.65	2
3	74.10	1	87.11	3	05.11	2
1	78.76	3	87.56	2	08.40	1
1	80.80	1	88.47	1	15.02	3
1	80.91	2	88.97	1	21.89	4
2	81.39	2	90.07	1	23.81	4
1	82.50	3	91.87	1 +	24.50	2
1	84.67	1	97.45	1 +	27.00	1
2	86.10	2	3004.58	4	30.91	3
1	89.21	2	05.91	1	35.59	2 +
1	89.96	2	07.38	1	37.45	3
1	92.33	2	09.10	1	37.83	4
1	99.79	1	14.37	1	38.50	1
1	2900.07	2	19.62	3 d	45.71	1 +
1	05.07	1	19.95	1	47.74	2
2	07.33	3	20.60	1	50.40	2
2	10.30	3	24.06	3	51.50	4
2	12.74	2	25.54	1	52.73	4
1	13.70	1	27.05	1 +	55.90	5
1	14.09	2	27.82	1 +	58.06	1
3	15.52	2	28.57	3	59.35	2
3	23.23	2	35.15	1	62.40	1
2	24.15	3	45.90	2	62.84	1
2	26.94	1	46.30	1	63.55	1
1 +	29.25	3	46.87	2	67.07	1
1	32.07	3	47.26	1	71.65	1
2	36.80	1 Ir?	47.45	1 +	72.40	3
2	38.39	1	48.10	1 +	77.20	3
1	39.58	1	49.00	1 +	78.51	3
2	41.25	1	49.35	1 +	79.84	3
0	46.03	1	50.92	1 d	81.38	3
0	50.02	1 +	51.83	1	85.72	4
0	55.43	1	54.01	2	88.00	1
4	55.54	2	55.76	1	88.41	2
5	55.54	2	55.76	1	89.16	4
4	58.89	2	58.01	2	90.49	3
3	59.48	1	59.47	1	91.33	8
4	59.76	2	61.80	1	93.96	2
5	61.26	1 Cu?	67.42	3	94.69	3
3	61.78	1 +	71.15	2	97.26	5
3	63.64	2	74.82	1	99.99	1
3	65.26	2	76.75	2	3206.21	2
3	68.79	4	84.10	4	07.41	1
6	73.28	1	85.78	1	11.52	2
5	74.15	2	87.52	3	14.44	3
5	75.92	1	88.42	1	15.00	2
37	77.81	3	90.52	1		

3218'00	3	3331'26	3	3442'87	1	3560'53	1
18'40	3	31'42	4	47'89	4	64'31	4
32'65	2	32'66	1	48'72	3	80'41	1
33'45	1	36'85	1	50'47	3	83'24	10
35'92	2	38'69	8	51'30	3	83'67	3
37'80	3	43'05	4	55'36	5	90'65	3
42'81	2	43'55	1	55'57	3	93'70	3
49'30	1	44'34	4	57'21	4	94'07	1
50'16	1	52'52	2	58'07	5	96'32	20 ¹⁾
53'47	1	53'84	2	59'36	1	97'31	20
55'10	2	54'85	3	62'19	30	98'05	2
60'97	1 +	58'00	2	69'80	4	3600'90	2
63'30	10	60'04	4	70'82	20	06'05	8
63'95	1	60'95	5	71'46	2	08'25	2
67'62	1	62'33	3	72'40	3	10'93	1 +
68'62	3	68'52	5	73'93	1	12'62	15
70'72	2	68'91	3	74'95	20	14'67	1
71'75	10	69'82	3	77'96	1	14'93	6
73'47	1	72'40	8	78'65	1	20'61	6
74'90	2	72'68	4	79'07	15	26'75	15
76'11	2	77'28	4	81'33	2	27'30	2
78'60	1	77'81	4	83'20	1	27'95	3
80'68	20 u	80'80	3	84'19	3	39'69	8
81'83	5	81'60	3	87'36	2	42'83	1
83'71	20 u	85'92	5	87'61	2	48'51	1
85'99	1	87'16	1	89'81	1	51'53	1
86'54	2	89'34	2	91'21	2	53'64	1
88'16	2	91'85	1	91'35	2	55'04	4
89'26	5	91'92	2	94'58	3	58'15	50
89'73	5	92'24	1	98'88	10	61'55	1
94'42	5	95'01	3	3500'70	1	61'77	1
96'86	4	96'95	100 u	02'67	50	62'02	5
97'41	1	99'82	10	05'55	3	66'39	15
99'06	2	3401'11	2	07'48	20	67'08	4
3300'56	6 d	04'03	1 +	08'65	2 +	74'92	5
01'40	1 +	06'70	4	11'69	2	81'19	8
01'80	1 +	07'38	2	11'94	3	90'88	15
02'49	1 Na?	07'87	2	13'25	3	91'50	2
03'49	1	12'43	10	19'67	2	92'51	50
04'25	2	20'32	4	25'80	3	95'10	2
05'30	3	22'43	2	28'18	30	95'65	10
07'10	1	24'49	8	38'27	4	96'24	1
07'47	1	28'52	1	38'41	5	98'40	4
08'06	2	32'24	1	42'05	5	98'76	5
09'67	1	35'03	200 u	44'13	10	99'46	2
14'67	2	40'69	3	49'70	10	3701'07	30
23'24	50 u	42'79	3	50'15	2	13'18	10

1) Kommt auch in Ru vor.

3713.60	3	3902.66	1	4211.26	30	4601.82	1
13.98	1	04.35	2	18.15	1	08.30	3
14.99	2	05.41	1	30.36	2	20.07	3
20.91	1	12.98	1	44.60	3	26.12	1
25.10	1	13.64	4	58.62	1 +	34.05	1
34.34	1	16.55	1	70.72	1	39.53	2
35.44	5	22.34	4	73.59	4	43.35	3
36.00	1	34.39	10	76.97	2	66.25	1
37.43	5	35.11	2	78.74	4	75.20	8
44.32	8	35.99	4	88.89	15	77.55	2
48.37	10	38.05	1	96.93	5	83.09	1
54.26	5	42.88	10	4308.99	1	89.60	1
54.44	5	44.10	2	15.14	2	96.44	1
55.73	3	53.20	1	36.19	1 +	4704.22	2
60.55	3	58.31	4	42.60	2	07.10	1
65.24	15	59.00	30	45.25	1	19.53	1
70.13	10	64.68	4	45.62	2	21.14	2
71.77	2	68.33	2	49.32	1	24.47	1
75.85	3	75.48	10	62.40	1 +	31.35	1
78.28	10	84.56	10	73.22	4	45.27	4
88.64	15	95.77	8	75.00	30	55.73	1
90.58	1	96.31	10	76.35	1	70.97	1
92.33	4	4023.29	6	80.11	8	71.70	1
93.40	15	26.09	1	88.24	1	77.35	1
99.46	20	48.56	4	4402.74	1	91.20	2
3806.08	10	49.17	3	10.45	1 +	94.35	1
06.91	10	53.60	3	20.17	1 +	98.83	1
09.65	3	56.50	3	21.38	1 +	4800.10	2 Cd?
12.61	4	77.74	4	23.84	1 +	01.51	1
15.18	10	80.70	2	24.23	2	03.38	1
16.62	10	81.98	2	33.50	3	10.65	4
18.34	10	82.99	15	84.00	2	13.60	1
18.90	1	84.45	2	92.65	4	17.22	1
22.43	15	87.94	3	4503.96	4	33.65	1
28.61	15	88.64	4	28.91	6	42.59	3
29.17	1	97.69	10	30.77	1	44.20	5
34.03	10	4107.65	4	44.45	2	51.82	8
34.39	6 (Fe)	16.49	4	48.89	3	61.52	3
34.89	3	19.85	8	51.83	4	61.80	1
44.55	1	21.86	15	57.35	2 +	65.94	3
49.14	2	25.05	2	58.90	3	88.08	1
54.81	3	29.06	20	61.08	3	98.05	1
56.15	3	35.45	20	65.37	2	4908.77	2
56.62	10	37.01	1	68.55	1	13.67	1
70.16	5	54.52	10	69.19	5	19.04	1
72.57	3	58.64	2	70.51	1 +	19.87	1
77.47	5	77.80	3	71.48	2	22.67	2
88.48	2	96.68	10	72.81	1	34.23	1
98.13	2	4206.75	3	99.6	1 +	45.00	2

4960·30	1 +	5185·18	1 +	5390·67	5	5730·65	1 +
61·10	1 +	93·29	5	5404·90	3	42·99	1
63·89	4	97·73	1 +	23·48	1	92·88	2
66·56	1	5203·50	1	24·25	5	96·00	1 +
77·93	3	07·12	2	24·90	2	5803·52	1 +
79·34	3	11·67	2	25·60	2	07·10	3
85·16	2	12·88	2	39·74	2	22·00	1 +
96·05	1	13·50	1 +	41·51	2	31·80	3
97·95	1	14·94	1	44·50	2	5907·50	1 +
5012·60	1 +	22·86	2	45·41	3	18·72	1 +
25·75	1 +	25·76	1	68·30	3	41·75	1 +
28·50	2	30·79	3	68·95	1	52·65	1 +
46·59	1	37·31	4	71·06	3	83·84	10
57·57	1	37·94	1	76·35	1	91·40	1
64·50	2	48·90	1 +	81·60	1	6102·96	2
73·63	1	51·57	2	84·44	2	16·35	1 +
85·68	2	59·41	2	92·04	1 +	28·3	1 + br
87·00	2	68·15	1	97·20	1 +	6200·20	2
90·80	4	69·46	2	5503·83	1	53·92	2
5105·68	4	69·68	2	04·87	1	76·95	1
10·13	1	80·30	2	35·26	4	77·73	1
20·83	2	92·31	3	42·25	1 +	93·65	1
30·94	1	5314·94	3	44·82	4	6319·79	3
45·17	1	28·19	1	95·10	1	32·50	1 +
55·72	3	29·92	5	99·68	10	33·25	1 +
57·29	2	31·22	2	5607·92	1	6415·00	2
58·87	3	36·85	1 +	08·55	2	6510·69	2
60·50	1 +	49·51	1	26·30	1	19·99	3
65·23	2	54·60	10	33·00	1	6628·10	1
76·14	3	56·69	2	59·84	1	30·44	2
77·44	2	79·26	5	86·60	3	6752·66	3
78·36	1 +	81·75	1 +	5702·70	1	6966·0	1 +
84·38	3	84·25	1 +	27·50	1 +		

LVI. Ru. Ruthenium.

Ältere Messungen: H. A. Rowland und R. R. Tatnall, Astroph. Journ. III (1896). H. Kayser, Berl. Akad. (1897). J. M. Eder und E. Valenta, Wiener Akad. 119 IIa. (1910) (Rot).

Material: Im Ultraviolet Metall von Heraus, im Sichtbaren Ruthenium-chlorid, auf Gaskohle.

Verunreinigungen: Ca, Mg, Pd, Pt, Rh.

Linienzahl: 1948.

Zwischen λ 3507—3591, λ 3649—3898 und λ 3957—4189 auf Kupfer, sonst auf Gaskohle gemessen.

2304.95	1 +	2464.77	1	2528.80	1	2581.25	2
07.04	1 +	67.65	1	28.99	1	82.02	1
17.89	1	70.61	1	33.35	1	83.14	1
20.79	1	70.78	1	39.80	1	84.23	1
21.10	1	71.57	1	40.40	1	85.41	1
34.00	1	74.13	1	41.37	1	89.12	1
35.05	1	75.47	2	43.34	2	89.65	2
40.78	1	76.38	1	43.76	1	91.10	1
42.92	1	76.96	2	44.32	2	91.20	3
49.37	1	79.01	2	45.86	1	91.75	1
51.42	1	79.43	1	46.77	2	92.12	2
53.65	1	79.62	1	49.26	1	94.95	2
58.01	2	81.21	1	49.58	2	95.73	1
58.87	1	82.24	1 +	49.67	3	97.44	1
60.16	1	82.63	1	51.84	1	98.66	2
60.63	1	84.06	1	52.08	1	2601.56	2
60.77	1	90.00	2	52.39	1	03.90	1
70.28	1	91.85	1	52.51	1	04.41	1
73.23	1 +	93.77	1	54.06	1	05.45	2
75.39	1	94.12	1	55.75	1	05.95	2
75.74	1	94.57	1	55.96	1	07.43	1 +
87.97	1	95.76	2	56.07	1	08.00	1
92.52	1	97.75	1	56.38	1	09.18	3
93.10	1	98.51	2	57.21	1	09.56	2
93.38	1	98.66	2	57.77	1	11.14	2
95.80	1	99.86	1	58.63	2	12.17	4
97.75	1	2500.93	1	59.50	1	13.00	1
2402.80	2	01.56	1	60.36	2	14.15	2
03.24	1 +	01.98	1	60.93	2	14.67	2
03.60	1 +	02.46	1	61.90	1	15.18	2
05.25	1	07.10	2	63.24	2	17.89	2
07.99	1	08.36	2	64.50	1	18.84	1
08.36	1	08.50	1 +	64.66	1	19.11	1
11.00	1	09.16	1	65.27	1	19.75	2
14.44	1	10.23	1	66.67	1	20.71	2
20.93	1	11.05	1	68.00	1 (Al)	20.97	1
23.05	1	11.66	1	68.85	2	21.19	1
29.68	1	12.08	1	69.83	1	23.94	1
33.02	1	12.90	2	70.20	1	26.30	1
37.00	1	13.42	1	71.07	2	26.45	1
47.55	1	15.36	1	72.38	1	26.56	1
50.00	1	17.39	2	72.51	1	27.75	1
50.66	1	17.72	1	75.33	1	28.61	1
55.01	1	20.05	1	77.05	1 +	30.01	1 +
55.61	2	21.73	1	78.65	2	30.31	1
56.52	2	24.96	1	79.07	2	31.67	1
56.65	2	25.27	1	79.30	2	32.21	1
58.72	1	25.72	1	79.63	2	32.57	1
63.04	1	26.92	1	80.91	2	33.53	1

2635.94	3	2672.47	1 +	2715.31	1	2763.52	2
36.63	1	73.12	1	15.56	1	64.00	1
36.75	2	73.57	2	15.84	1	64.81	1
38.61	2	73.66	2	16.65	1	65.25	1
39.22	2	76.43	2	17.06	1	65.54	1
39.95	1	77.05	1	17.48	2	66.33	1
40.42	2	77.40	1	19.60	4	69.02	2
41.54	1 +	78.26	1	19.78	1 +	70.40	1
42.07	1 +	78.86	5	21.65	2	70.81	1
43.05	4	79.85	1	22.50	1	72.58	1
44.70	1	83.79	1	22.76	2	72.71	1
46.09	2	84.19	1	22.88	1	73.07	1
46.71	1	85.25	1	24.15	2	74.59	1
47.40	2	86.40	4	25.55	3	75.28	1
48.03	1	87.22	2	27.05	1	75.73	1
48.55	2	87.60	2	28.90	2	76.00	1
48.86	2	88.23	1	29.54	2	76.50	1
49.61	2	88.67	1	30.40	2	77.62	1
50.09	1	89.00	1	31.02	2	78.50	3
50.52	1	89.99	2	32.00	1	79.07	1
50.70	1	90.51	1	33.18	1	80.87	1
51.40	2	90.94	1 +	34.45	4	82.31	1
51.62	1	92.29	5	35.82	5	84.63	1
51.95	3	92.95	1	36.40	1	85.05	1
53.25	1	93.42	1	36.93	1	85.75	2
53.80	1	93.76	1	37.54	1	87.92	3
54.42	1	96.65	1	37.88	1	92.43	1
54.55	1 +	97.60	1	38.98	1	92.75	1
54.93	1	99.95	2	39.30	3	96.66	1
55.24	1	2700.57	1	40.34	1	96.80	1
55.32	1	00.75	1	44.00	2	98.11	1
56.32	1	01.43	2	44.11	1	2801.99	1
56.65	1	02.52	1 Pt?	44.54	2	03.61	1
56.76	1	02.92	2	45.15	1	06.86	1
57.24	1	03.40	1	45.20	1	08.34	1
58.47	2	03.87	1	45.90	1	10.14	3
58.87	1	05.41	1	46.16	1	10.69	8 d
59.69	4	07.55	1	48.09	2	11.35	1
60.67	1	08.05	2	50.44	1	12.93	1
61.25	1	08.72	1	52.37	1	13.79	1
61.68	4	08.92	1	52.55	2	14.97	1
61.93	1	09.29	2	52.86	2	17.20	2
64.88	2	10.34	1	53.54	2	18.46	3
65.83	1	10.83	1	54.70	1	18.92	1
67.50	1	12.20	1	57.17	1	19.05	2
68.05	2	12.52	3	57.92	1	21.30	1
68.44	1	12.96	1	60.28	1	22.15	1
70.59	1 +	13.29	2	62.41	2	22.66	2
70.83	1 +	13.81	1	63.25	2	24.90	1

1	2877.20	1	2919.72	3	2965.67	3
3	77.93	1	20.37	1	65.80	2
3	79.46	1	21.06	1	66.69	1
1	79.86	3	21.28	1 +	67.46	1
1	80.35	1	23.95	1 +	68.57	2
2	81.40	2	24.77	1	69.08	2
1	82.23	2	25.20	1	71.90	1
2	82.71	1	27.24	2	74.11	2
1	83.71	3	27.65	2	74.46	2
1	84.62	2	28.60	1	75.25	1
3	84.96	1	29.55	1	76.70	3
2	86.63	4	30.02	1	77.04	3
1	87.24	1	33.35	1 +	77.35	2
1	87.39	1	34.29	1	77.60	1
2	88.10	2	36.12	1	78.47	1
1	88.74	1	36.35	1 +	78.75	2
2	91.01	1	37.45	1	79.83	3
1	91.25	1	37.65	1 +	80.05	3
1	91.75	2	39.25	1	82.05	2
2	92.64	3	39.80	1	85.95	1
1	93.85	1	40.06	2	86.45	1
1	95.93	1	40.47	2	87.81	1
1	96.64	2	42.36	1	88.20	1
3	97.82	1	43.57	1	89.06	5
1	98.64	2	44.03	2	89.44	1
1	98.78	1	44.14	1	90.43	2
1	99.84	1	44.26	1	92.25	1
1	2901.90	1	45.79	3	93.09	1
1	02.05	3	45.89	2	93.39	3
1	02.20	3	47.10	3	95.07	4
3	02.97	1	49.60	3	96.04	1
1	03.18	1	50.10	1 +	97.02	2
3	04.30	1 + -	50.65	1	97.54	2
1	04.84	1	51.54	1	97.73	2
1	05.76	3	52.63	2	98.45	3
1	05.93	3	53.12	1 +	99.00	1
1	06.43	2	54.60	3	3000.34	1
3	09.03	3	55.48	2	01.75	2
1	09.34	1	55.70	1	02.17	1 +
2	10.54	1	55.96	1	03.60	1
2	10.90	1	56.23	1 +	04.34	1
1	12.55	1	58.13	2	04.73	1
1	12.87	1	59.85	2	06.09	1
1	13.28	2	61.11	1	06.70	5
2	14.41	2	61.81	2	08.36	2
1	15.74	1	63.54	2	08.90	2
1	16.37	10	63.84	2	09.80	1
10	17.24	1	64.42	1	10.60	1
1	17.85	2	65.30	3	13.04	2

3013.47	2	3080.31	2	3129.72	2	3185.56	1
17.36	4	81.01	3	29.94	3	86.16	5
19.45	2	83.26	2	33.00	3	88.06	2
20.62	3	84.65	2	33.82	1	88.46	3
20.99	3	85.59	1	36.05	1 +	88.73	2
25.23	1	86.19	3	36.50	1 +	89.03	2
27.17	1	86.63	1	36.70	4	89.41	2
27.89	1	87.04	1	37.05	1 +	89.84	2
30.89	2	88.16	1	38.89	1	90.10	4
32.02	1	88.30	1	39.40	1	91.91	1
33.55	3	89.26	4	40.23	1	92.20	3
34.15	2	89.92	3	40.62	2	93.65	2
35.58	2	90.35	3	41.10	4	94.87	2
36.57	2	91.01	1	43.77	1	95.46	1
37.85	2	92.01	3	44.39	3	97.74	4
38.07	2	94.02	1	44.81	1 +	98.44	2
38.29	3	94.51	2	46.18	1	99.25	1
39.78	1	94.62	1	47.32	2	3201.36	1
40.06	2	96.68	8	48.60	2	01.63	3
40.43	3	97.35	2	50.30	1 +	02.70	2
42.03	1	97.71	3	50.82	3	04.17	3
42.60	3	98.97	1 +	51.50	1	05.42	3
42.93	2	99.41	6	53.95	3	08.40	1 +
45.83	4	3100.95	8	54.55	2	08.50	1 +
46.09	1	04.57	1	56.96	1	08.86	1 +
46.34	2	04.72	1	57.55	2	09.75	2
48.60	2	05.39	2	57.78	1	10.30	2
48.89	3	05.51	2	59.01	3 Ca?	13.10	3
50.30	1	06.95	2	60.03	4	14.49	1
51.71	1	07.83	3	63.97	1	16.67	3
52.45	1	08.53	1	65.08	1	20.23	2
55.04	3	09.50	1	65.31	1	21.34	2
56.18	2	10.65	3	67.53	1 +	23.42	5
56.96	1	12.03	3	68.35	2	24.77	2
57.46	2	12.41	1	68.63	5	26.50	4
58.77	2 Os?	12.79	2	70.21	2	27.02	2
58.90	2	13.50	2	71.39	1	28.00	3
59.27	2	16.92	1	73.25	2	28.28	2
60.35	1	18.16	2	73.53	2	28.64	3
62.17	1	18.79	2	74.25	3	29.91	2
64.98	10	19.60	1	75.44	1	30.75	2
68.38	2	20.66	1	76.41	3	32.89	2
69.30	1	22.15	1	77.16	3	34.64	1 +
71.60	1	24.29	3	78.85	1	34.95	2
73.45	3	24.49	2	79.42	3	35.23	1
75.40	1 +	24.73	2	80.56	1	36.10	1
76.88	2	26.08	4	81.35	1 (Ca)	38.65	4
77.17	2	26.75	1	81.41	1	38.87	2
77.65	2	28.55	1	85.00	2	39.75	4

3241.37	4	3291.80	1	3336.76	2	3381.06	2
42.30	1	92.40	2	37.95	3	85.30	3
42.96	2	94.26	10	38.85	2	85.62	2
43.64	4	94.90	1+	39.69	10	85.85	2
44.47	1	96.25	3	39.90	2+	86.38	2
44.59	1	96.79	3	41.23	2	87.37	2
44.71	1	97.39	2	41.36	1	88.84	3
48.97	1	98.10	3	41.81			
50.12	3 d	98.56	2	42.85	1	89.65	3
51.47	2	99.47	2	44.67	3	92.05	2
52.04	2	99.93	1	44.94	1	92.67	5
52.42	1+	3301.73	8	45.45	2	99.51	2
52.70	1	02.05	2	47.75	2	3400.12	1
53.06	1	02.26	1 Pd?	48.15	2	00.75	1
53.13	1	04.14	3	48.83	2	00.90	1
54.67	3	04.65	1	50.25	2+	01.65	2
54.83	3	04.79	1	50.69	1	01.90	5
55.35	1	04.95	2	52.08	2	03.94	1
56.46	2	05.30	5	53.15	1	05.38	1
58.17	2	07.68	1	53.45	2	05.41	1
59.10	1+	08.11	2	53.79	2	06.03	2
59.81	3	08.76	1	53.97	1+	06.73	2
60.31	2	09.97	1	54.77	1	07.05	2
60.48	5	10.22	1	55.80	2	09.42	1
61.26	2	11.08	2	56.34	2	09.70	2
64.00	2	12.35	1	56.60	1	11.77	5
64.70	3	14.20	1	58.77	1	12.22	1
64.80	3	14.90	2	59.23	5	12.95	2
66.60	3	15.17	3	61.31	2	13.86	1
67.25	1	15.36	3	62.14	3	14.12	1
68.34	5	15.58	2	62.47	1	14.43	1
69.10	1	16.52	8	64.24	2	14.78	2
70.40	1	17.03	1	64.95	1	16.32	2
72.38	1	18.01	3	68.59	8	17.50	20
73.22	4	19.00	5	69.42	1	17.79	1
73.77	1+	19.65	1	69.80	2	18.11	1
74.83	4	19.95	1	71.60	1	19.38	2
77.50	1	20.93	1	72.00	3	20.24	3
77.70	3	21.39	1	72.93	1	22.59	1
79.52	1	22.40	1	74.13	2	26.09	2
80.61	3	24.06	1+	74.78	3	26.57	1
81.74	1	25.13	3	75.04	2	28.50	20 u
82.00	2	25.38	3+	75.38	1	28.80	4
82.75	1	26.25	1+	76.20	1	29.72	4
85.07	3	27.83	3	78.16	3	30.56	1
85.50	1	28.58	1	79.18	1	30.91	5
86.05	1	32.20	3	79.40	2	32.36	2
89.37	1+	32.77	2	79.75	3	32.52	2+
91.27	1	35.82	5	80.32	3	32.91	5

3433-40	3	3502-58	3	3554-04	3	3599-54	1
3534	3	02-65	1 Rh?	54-43	1	99-91	5
3647	2	09-86	2	54-80	1	3601-64	2
3687	30 u, r	11-30	1	55-98	1	05-80	3
3851	5	11-74	1	56-30	1	06-30	1
3981	2	13-06	1	56-55	1	08-87	2
4035	3	14-29	1	56-80	3	09-25	2
4330	2	14-65	3	57-22	3	14-01	1
4545	1	14-91	2	59-79	1	14-50	1
4610	1 +	15-85	1	60-01	1	17-10	3
4623	2	16-05	1	60-15	1	19-34	4
4662	2	16-35	1	60-32	1	20-45	3
4911	5	17-55	1	61-72	1	23-81	3
5306	3	19-14	2	62-05	2	24-07	1
5553	1	19-80	4	62-76	2	25-33	4
5588	1	20-29	4	63-30	1	26-89	4
5676	3	22-14	1	63-75	1	27-44	2
5784	1	22-44	1	63-97	1	31-86	3
5974	2	25-04	1	64-30	1	32-56	1
6211	2	25-78	1	64-51	2	34-08	3
6330	3	25-95	1	64-71	2	35-09	10
6547	1	26-70	1	64-96	2	35-66	3
6719	2	28-84	5	67-29	3	37-62	5
7241	3	31-55	4	67-88	1	38-16	2
7286	2	31-96	1	68-62	1	40-78	4
7391	5	32-96	4	70-75	8	45-82	1
7500	2 Rh?	35-20	1	71-91	2	46-25	5
8030	1	35-52	3	72-19	3	48-54	1
8105	1	35-99	3	73-83	1	49-35	1
8145	5	36-71	2	74-30	1	50-48	5
8250	2	38-10	5	74-75	1	52-48	2
8332	4	39-42	3	75-20	1	52-65	1
8345	4	39-52	4	77-02	1	52-83	1
8635	2	40-37	1	77-68	1	53-85	1
8695	2	41-20	1 Fe?	78-84	1	54-55	3
8988	1	41-79	3	79-92	3	57-32	2
9088	1	45-93	1 +	82-96	1	57-74	1
9225	1	46-15	1	83-25	1 Rh?	59-62	1
9337	1	47-12	1	84-32	3	60-97	2
9440	3	47-33	1	85-96	1	61-51	6
9613	3	47-53	1	87-35	8	61-72	3
9629	2	49-82	1	89-38	5	63-52	5
9803	1	49-90	1	90-69	1	67-16	1
9809	2	50-43	3	91-05	2	68-14	1
9909	50 u	50-80	2	93-18	20	68-88	1
3500-67	1	51-40	1	96-31	20 ¹⁾	69-70	5
0153	2	53-85	1 +	98-64	1	71-37	2

¹⁾ Kommt auch im Rh vor.

3672.20	1 +	3733.18	2	3803.31	3	3860.84	3
72.54	2	35.15	1	05.56	2	61.57	1 +
75.41	2	37.53	3	05.80	1	62.80	8
76.80	2	37.90	1	08.82	4	64.96	1
77.10	2	38.78	2	12.89	4	65.51	3
78.14	1	39.05	3	13.34	1	67.30	1
78.22	1	39.60	4	15.00	3	67.97	8
78.47	3	41.37	1 Cu?	17.44	5	71.35	2
80.25	1	42.44	10	18.06	2	73.69	4
83.73	1	42.95	4	18.50	1	76.21	3
84.81	1 Cu?	44.10	1	19.17	4	76.80	2
85.22	1	44.35	2	19.90	2	80.97	2
86.10	2	44.56	4	20.55	2	82.15	3
86.75	1	46.36	1	21.81	1	84.20	3
90.19	1	52.01	2	22.22	4	84.83	3
93.75	2	52.95	2	25.07	4	87.95	3
96.74	3	53.70	5	26.24	2	90.35	3
97.92	2	55.24	3	28.86	3	91.58	2
98.02	1	55.86	2	29.45	2	92.40	5
3700.50	2 +	56.09	5	29.60	1	92.92	2
01.15	3 +	59.98	3	31.03	2	94.39	2
01.47	1	60.18	4	31.94	5	97.40	3
01.99	1	61.63	4	35.20	4	97.84	1
02.36	2	63.71	1	36.10	1	98.50	3
03.07	1	64.19	2	36.81	2	3901.42	4
03.35	2	65.95	1	38.20	4	06.14	1
05.50	2	66.63	1	38.82	2	08.90	3
09.23	1	67.51	5	39.81	6	09.22	8
10.45	1	70.61	1	40.91	3	11.30	2
12.45	3	71.22	1	41.12	3	12.26	3
14.80	1	72.03	1 + Cu?	42.76	2	15.00	4
15.70	2	73.32	1	43.22	3	21.08	5
16.32	2	77.72	3	46.80	4	22.48	1
17.14	4	77.89	3	47.33	1	23.62	10
17.81	1	78.83	3	47.59	1	24.76	2
18.45	1	79.56	1	49.05	1	26.06	10
19.48	3	80.12	2	49.55	1	26.60	1
20.90	1	81.32	3	50.53	5	31.95	10
22.45	1	81.83	1	52.21	3	32.45	1 +
25.12	3	82.88	2	52.67	1	35.50	1
25.61	1	84.90	1	52.94	1	36.94	1
26.24	3 +	86.18	10	54.80	2	38.05	4
27.06	10 u	90.64	10 +	55.68	1	39.25	1
28.16	10 + u	94.46	1	56.54	3	41.81	3
30.59	4	95.33	3	57.05	2	42.22	3
30.74	4	98.20	3	57.63	5	44.33	3
31.10	1	99.00	8 +	58.79	2	45.73	10
32.20	2	99.55	8 +	59.80	2	46.45	2
32.90	1	3800.41	2	60.57	1	49.55	3 r

3950.18	3	4049.58	3	4135.01	1	4248.28	2
50.38	3	51.56	5	37.39	3	54.51	1
50.57	4	52.36	4	44.32	10	55.55	1
51.35	3	54.23	5	44.94	1	55.86	1
52.47	1	54.86	1	45.92	8	56.78	1
52.85	5	59.02	1	46.91	8	59.15	4
54.04	1	59.60	1	48.53	3	60.16	3
57.37	1 +	63.14	2	50.49	3	63.54	2
57.60	2	64.26	2	56.46	1	65.75	2
65.06	5	64.61	4	57.98	1	73.12	1
69.95	2	66.46	1	58.50	1 +	77.41	2
74.66	3	67.79	4	59.37	2	78.84	2
76.60	6	68.54	5	61.82	4	82.10	2
79.60	5	71.55	3	64.60	1	82.36	2
82.05	2	73.16	4	67.04	3	84.51	5
82.40	1 +	76.15	1	67.66	5	87.21	4
85.01	10	76.89	8	68.94	1	90.70	1
87.95	6	79.45	2	70.22	3	92.42	1
89.35	2	79.98	1 +	70.77	1	93.44	4
94.72	1	80.78	20	71.80	1	94.97	4
96.13	6	82.96	3	72.60	1	96.09	5
96.66	2	84.06	1	75.60	3	96.84	2
4005.80	4	85.58	5	82.62	3	97.88	10
06.74	4	88.55	1	82.82	2	4301.30	1
07.67	3	91.24	3	83.01	2	08.56	1
08.42	4	93.95	1	85.65	1	09.36	2
11.89	1	97.21	3	89.64	2	12.65	1
13.65	3	97.97	10	97.05	3	14.49	4
13.88	2	4100.53	3	97.75	4	16.79	3
14.30	2	01.41	1	99.06	4	18.59	3
16.90	1	01.90	4	4200.07	10	19.26	1
19.71	2	02.45	3	06.19	5	20.05	5
21.16	3	03.80	1 +	07.80	3	20.74	1
22.33	4	06.08	2	12.24	10	20.99	1
24.00	3	07.98	2	14.61	5	21.45	1
24.48	1	08.20	2	17.45	5	23.14	1
24.86	2	09.80	2	20.84	4	25.25	4
26.65	1	12.92	8	25.25	3	27.00	4
28.59	2	13.55	4	29.49	3	27.49	1
30.30	1	14.30	2	30.49	5	27.57	3
31.16	3	18.66	3	32.48	3	28.71	1
32.36	3	21.13	5	36.84	3	31.31	3
33.65	2	23.00	1	39.80	1	32.65	2
36.60	1	23.23	4	40.20	1	36.57	2
37.87	2	23.98	3	41.23	5	37.43	3
39.37	5	26.57	1	43.22	5	38.82	2
40.62	2	27.60	3	45.00	3	40.50	2
42.13	1	28.00	3	46.50	4 d	41.20	2
47.10	2 +	31.40	1	46.89	4	42.24	5

8	1	4490.42	3	4653.94	1	4815.73	5
4	4	91.88	2	54.50	4	17.51	2
8	4	98.32	5	56.60	1	22.73	1
2	5	4508.20	1	62.67	1+	26.36	1
7	3	08.74	2	69.32	1	26.73	1
8	3	10.25	3	70.15	3	28.85	1
0	2	11.36	3	74.81	3	33.18	3
9	1	16.44	1	81.97	5	38.30	1
0	1	17.05	4	84.19	4	39.18	3
9	2	17.99	4	85.96	1	39.91	1
7	2	21.12	3	90.29	4	41.90	1
8	10	31.04	3	4709.68	10	43.90	1
4	2	42.60	1	12.20	1	44.72	3
5	3	43.85	2	16.20	1	48.02	1
5	4	47.10	1	21.11	1	48.31	1
8	4	47.46	4	31.51	3	52.03	1
4	3	48.01	3	33.67	3	53.66	1
15	1	49.59	1	37.06	1+	54.71	2
60	5	50.11	3	38.61	1	60.60	1
20	3	52.30	3	43.21	2	62.02	3
14	2	54.69	10 u	51.18	1	63.26	1
87	1	60.16	3	52.30	1	65.25	2
96	4	62.77	1	53.26	1+	69.32	5
75	2	64.87	2	56.40	3	69.96	1
21	8	80.24	3	58.03	6	74.50	2
46	1	84.63	10	61.73	1	75.20	2
03	3	87.29	2 Cu?	62.56	1	77.59	1
63	4	89.75	1+	62.77	1	82.83	1
15	3	91.32	3	64.59	2	85.20	1
99	2	91.75	1	67.34	1	88.80	1
19	1	92.72	4	69.50	3	95.53	2
68	5	96.90	2	73.34	2	95.75	3
49	1	99.27	4	74.19	2	99.41	2
52	1	4601.95	2	81.29	1	4901.24	1
60	1	05.85	2	81.94	1	02.02	1
95	8	12.52	1	83.51	1	03.23	4
70	3	17.83	1	84.45	3	04.75	1
53	5	26.20	1	87.54	1	05.19	2
22	10	28.50	1+	94.56	3	08.07	3
69	1	35.86	4	95.74	3	10.40	1
53	1	38.60	1	98.60	3	11.75	1
45	2	39.51	1	4801.35	1	13.46	1
21	1	41.15	1+	03.07	1	14.35	1
11	4	42.76	1	05.09	3	21.22	3
50	1	45.27	4	06.40	1	34.26	3
59	2	47.00	1	09.90	1	35.80	1
60	4	47.79	5	12.43	1+	37.40	1
20	2	48.28	1	13.42	1	38.59	3
857	3	52.35	1+	14.89	1	44.18	1

4955.43	3	5134.08	1	5350.76	1	br
60.05	2	34.30	1	59.80	1	
67.80	1+	36.73	4	61.99	4	
68.15	1+	42.93	3	62.25	1	
69.08	3	47.41	3	65.82	1	
74.26	2	51.22	3	73.50	1	
75.54	1	53.35	1	78.02	3	
76.36	3	55.31	3	86.09	2	
78.15	1	60.16	1	5401.22	3	
80.51	3	65.2	1	01.60	2	
83.65	2	71.23	8	19.06	2	
87.45	2	95.16	3	27.81	2	
92.92	3	5200.03	2	39.41	1	
5003.71	1	02.26	1	39.60	1	
05.44	1	09.65	1	52.92	1	
10.77	1	13.60	2	55.00	3	
11.40	3	14.24	1	56.30	3	
15.11	2	23.70	2	73.05	1	
19.15	1	35.75	1+	75.36	1	
20.45	1+	42.55	1	79.60	3	
26.36	2	43.12	1+	80.49	2	
28.34	1	45.60	1+	84.51	3	
39.78	1	51.82	2	84.82	1	
40.50	1	57.27	2	96.91	1	
40.91	1	64.12	1+	5501.24	1	
41.52	1+	66.65	1	10.94	3	
45.55	1+	67.00	1	12.61	1	
47.47	1	69.72	2 (Fe)	18.05	1	
53.16	1	75.27	1+	22.00	1	
57.51	8	81.01	1	31.20	1	
62.83	1	84.25	3	40.85	1	
73.15	2	91.35	2	49.95	1	
77.99	1	99.00	2	55.00	1	

LVII. S. Schwefel.

Ältere Messungen: Fehlen.

Material: Schwefel auf Kohle.

Linienzahl: 0.

LVIII. Sa. Samarium.

Ältere Messungen: Ch. Rütten, Ztsch. für wiss. Phot. 3 (1905)

J. M. Eder und E. Valenta, Wiener Ber. 119 IIa. (1910) (Rot).

Material: Samariumnitrat aus Oxid von Demarcay, auf Gaskohle.

Verunreinigungen: La.

Linienzahl: 1679.

2788·50	1 +	3143·55	1 +	3228·63	1	3272·63	1
96·80	1 +	45·96	1	28·92	1	72·71	1
2809·57	1	47·33	1	30·69	2	72·95	2
10·96	1	52·25	1	31·66	2	73·62	2
31·06	1	52·65	2	32·07	1	75·99	1
66·18	1	62·28	1	32·76	1	76·85	2
68·51	1	62·44	1	33·80	2	81·00	2
91·43	1 +	70·00	2	34·55	1	85·79	2
2910·40	1	70·33	1	36·75	2	86·35	2
3034·96	1	78·25	1	37·30	1	86·67	1
39·20	1	84·03	2	38·02	1	90·50	2 d
47·03	1	86·15	1	39·77	2	90·70	1
50·90	1 +	86·40	1	41·30	2	93·51	2
51·12	1 +	87·12	2	41·71	1	95·60	2
61·67	1	87·35	2	42·17	1	95·96	2
65·31	1	87·89	2	44·81	1	98·25	2
65·88	1	88·84	1	45·89	1	3301·12	1
66·15	1	93·15	2	47·00	1	01·83	2
67·90	1	96·22	2	48·95	1	02·94	1

Bogen

Sa

3321·35	3	3397·90	1	3480·73	1	3582·80
23·95	2	3400·00	1	82·85	1	83·52
25·40	2	02·60	3	87·55	1	84·40
25·63	2	03·23	1	92·77	1	87·60
28·05	2	08·79	3	92·92	1	91·90
29·75	1	11·43	1	93·75	1	92·78
32·86	1	14·05	1	96·05	1	93·56
33·80	1	15·10	1	3500·00	2	93·88
35·19	1	18·26	2	00·65	2	98·07
36·25	1	18·64	2	01·40	1	3601·84
40·75	3	19·88	2	03·44	1	02·15
41·58	1	20·65	1	04·35	1	04·42
43·64	2	22·33	1	07·00	1	05·13
43·78	2	24·90	1	07·23	1	09·63
44·50	2	25·38	1	09·27	1	12·58
46·50	1	26·34	1	11·39	2	13·72
47·05	1	28·13	1	11·76	1	15·37
47·45	1	29·90	1	12·82	1	20·25
48·81	2	32·29	1	13·10	1	20·74
51·05	2	33·85	1	13·20	1	21·35
51·43	1	35·40	1	18·20	1	22·65
54·38	1	37·23	2	18·46	1	23·50
54·43	1	37·77	1	23·25	1	26·65
54·86	1	38·19	2	24·71	1	27·12
58·40	1	39·73	1	25·63	1	28·10
60·78	1	40·65	1	27·00	1	29·37
61·58	1	44·75	1	30·74	2	30·85
64·06	1	45·75	1	32·18	1	31·30
64·94	1	49·68	1	32·71	2	34·42
66·01	3	52·89	1	34·69	1	35·05
67·40	1	53·67	1	35·02	1	36·22
68·69	2	55·07	1	35·76	2	36·33
69·18	1	56·22	1	36·87	1	38·89
69·58	2	58·03	1	36·98	1	39·40
70·74	1	59·32	1	38·97	1	39·50
71·35	2	59·53	1	42·61	1	42·88
76·64	1	60·76	1	52·46	1	45·49
77·95	1	61·26	2	54·31	1	46·05
78·43	1	61·53	1	56·90	1	47·41
78·70	1	62·84	1	57·55	1	49·63
82·57	3	63·35	1	59·26	3	50·31
84·80	2	64·24	1	60·45	1	51·11
85·05	1	64·56	1	61·75	1	55·01
85·55	1	68·00	1	67·00	2	56·37
87·19	1	71·26	1	68·45	4	59·79
87·78	1	74·13	1	71·25	1	61·50
89·45	2	79·30	1	77·94	2	62·40
90·25	1	79·68	1	81·06	2	62·81

3668.05	2	3739.30	10	3783.50	1	3839.16	2
70.98	8 v	41.42	4	83.63	1	39.37	2 +
72.35	1	44.01	5	84.00	1	40.62	3 d
74.20	1	45.77	5	85.49	1	43.66	3
76.97	1	47.75	3	87.32	2	43.92	2
77.82	2	48.77	1	88.29	3	44.65	1
78.23	1 +	50.82	1	90.95	1	46.16	1
80.13	1	51.69	1	91.45	2	47.67	2
81.13	1	53.20	1 +	92.20	2	48.95	2
81.89	2	54.33	1 +	92.75	1	49.13	2
87.25	1	54.78	1	94.14	3	52.05	2
88.56	1 Eu?	54.97	1	94.51	1	54.39	3
90.24	1	55.40	3	96.31	1 +	54.74	3
91.10	1	56.17	1	97.44	1	56.08	3
92.38	2	56.53	2	97.90	4	58.06	2
92.94	1	56.66	2	99.71	3	62.20	1
93.03	1 +	57.65	3	3800.20	1 +	62.37	1
94.13	3	58.60	2	00.51	1	65.35	2 +
94.45	1	59.12	3	01.05	3	71.94	2
3700.33	1	60.18	2	03.23	1 +	73.36	1
00.71	2	60.83	4	04.10	1	75.30	2
01.06	2	62.74	2	04.87	1	75.67	2
01.70	1	64.51	3	05.76	2	77.32	1
05.18	1	65.56	1	08.05	1	80.90	2
06.89	2	67.53	2	08.59	2	81.52	2
07.11	2 r	67.87	2	09.90	2	82.65	1
08.52	2	68.04	1	10.05	2	83.93	1
08.80	3	68.38	1	10.60	2	85.47	5 r
09.64	1	70.86	1	12.22	3	86.05	1
11.00	1	71.50	1	13.77	1	87.27	1
11.70	3	72.30	1	14.72	2	89.32	3
12.25	2	72.80	2	21.97	2	90.24	3
12.91	2	73.57	2	23.17	1 +	91.34	2
19.02	4	74.46	2	23.95	1 (Cy)	94.20	2
20.72	1	74.85	2	24.35	2	95.25	1
22.00	3	76.20	1 + br	24.70	2	95.60	1
24.17	1	77.25	1	25.13	1	97.12	4
25.03	3	78.00	1	26.36	3	97.32	1 +
26.38	1	78.29	3	26.68	1	3901.04	2
26.93	1	78.90	1 +	27.00	1 +	02.46	1
27.50	1	79.69	1	27.49	1	03.60	4
28.61	4	80.30	1	28.20	1	06.93	1
29.05	1	80.66	1	29.55	1 +	07.29	1 Eu?
29.90	2	80.93	2	30.45	2	10.25	1
31.42	4	81.07	2	31.65	3	11.06	1
36.10	4	81.79	1	33.99	3	13.14	1
37.25	3	82.50	1	34.74	3	13.53	1
37.60	2	82.81	1	35.85	2	13.76	1
38.48	2	82.92	1	36.66	2	16.51	1